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PUBLISHED BY THE AMERICAN ASSOCIATION TO PROMOTE THE TEACHING OF SPEECH TO THE DEAF

FRANK W. BOOTH, EDITOR

December, 1908

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FOR THE INCREASE AND DIFFUSION OF KNOWLEDGE RELATING TO THE DEAF

WASHINGTON, D. C.

HOME OF THE AMERICAN ASSOCIATION TO PROMOTE THE TEACHING OF SPEECH TO THE DEAF

THE ASSOCIATION REVIEW.

VOL. X, NO. 5.

DECEMBER, 1908.

THE REAL ROMANCE OF THE TELEPHONE, OR WHY DEAF CHILDREN IN AMERICA NEED NO LONGER BE DUMB.[1]

BY FRED DE LAND.

CHAPTER XXIX.

SCIENTISTS SHOW THEIR APPRECIATION.

Although he hesitated to take the time from his professional duties, Graham Bell presented to the members of the American Academy of Arts and Sciences, a resume of his experiments, under the title of "Researches in Telephony." He touched upon the experiments and the inventions of Gray and Reis, and the discoveries of Page, Marrian, Beatson, Gassiot, De la Rive, Matteucci, Guillemin, Wertheim, Wartmann, Janniar, Joule, Laborde, Legat, Poggendorff, DuMoncel, Delezenne, Ferguson, Paul la Cour, Helmholtz, Gore, Sullivan, and others, giving due credit to each. He made it clear to his hearers that the essential factor in this problem of speech transmission was not the devising of a definite form of instrument or tube, nor an apparatus having definite structural peculiarities, nor the combining of a certain number of parts into an operating whole. The solution of the problem was to so control the movements of the receiver diaphragm that its motions would exactly copy the vibrations of the transmitting diaphragm and thus set up a series of sound waves in the receiver exactly corresponding to those produced by the vocal organs. In other words, it was to so cause the electric current to flow that the receiver would not only reproduce a few or a majority or about all of the spoken words that impinged on the diaphragm of the transmitter in the form of sound waves, but would reproduce *each and all and every one* of the variations in articulation, with all

[1] Commenced in the October, 1905, number.

their varying characteristics, whether expressed in lightest whisper, in slow, sonorous sentence, or in quick, abrupt remark.

Here the world of science received some of the details of a new method for the transmission of speech, learned of the creation of a new art and began to dimly perceive how great was this marvellous achievement modestly explained by this unassuming but enthusiastic young teacher; how the original and magnificent conception had been materialized into tangible, useful form, and how the masterly mind that perfected the theory was also able to devise a means that makes possible constant utilization of this method. Here the facts went on record, but so vast in its magnitude was this contribution to science that months elapsed before scientists were able to grasp all that it involved. Then they began to perceive that in the invention of the electric-speaking telephone, the simple combination of diaphragm and electro-magnet and undulating continuous current was the outgrowth of conception and perfected theory, and formed a practical materialization of both; that conception, theory, and apparatus were the honestly earned fruits not only of the inventor's "intellectual capacity and precision of thought," but of a thorough knowledge of the essential elements in each and every factor entering into the problem of the transmission of speech electrically.

Long afterwards the world learned how this remarkable knowledge was gained through long and patient research, through countless experiments, through financial expenditures that involved personal deprivations and hardships, and through discouraging criticism and bitter ridicule on the folly of wasting time and money in inventing a pretty but profitless scientific toy.

On Wednesday, July 11, 1877, Graham Bell and Mabel Hubbard were united in marriage at the home of her parents in Cambridge. A few days later the bridal couple left for England and a tour on the Continent, and did not return to this country until August, 1878.

In 1870, Graham Bell, then practically a penniless student, left London in search of health. Seven years later he returns with a lovely bride and is the recipient of many honors. For in 1876, Sir William Thomson (now Lord Kelvin) gave the telephone its meed of honor as a scientific achievement surpassing all else that he saw at the Centennial; while a few months later Mr. Preece displayed the first pair of commercial telephones received in England, having secured them from Graham Bell to show to

the members of the British Association for the Advancement of Science at the Plymouth meeting.

In November, 1877, Graham Bell is presented to Queen Victoria and has the pleasure of personally explaining the mechanism of the telephone. Then her Majesty takes the receiver and listens to the songs that Miss Kate Field is singing at Osborne Cottage. On this Monday evening the Queen was entertained from half-past nine until nearly midnight with explanations and experiments and gave expression to her delight.

Twenty-two years previously and just after ascending the throne, Queen Victoria had enjoyed the pleasure of a so-called "telephone concert" given through an adaptation of Wheatstone's method of transmitting musical notes with the aid of a fine-grained wooden rod. But only musical notes were transmitted.

In this connection it is interesting to recall that as a result of his many experiments in the mechanical transmission of sounds during the years 1820-28, Wheatstone stated that on discovering "that sounds of all kinds might be transmitted perfectly through solid wires and reproduced in distant places, I thought I had the most efficient and economical means of establishing telegraphic (or rather telephonic) communications between two remote points that could be thought of .... Experiments on a large scale, however, showed me that the velocity of sound was not sufficient to overcome this resistance and enable it to be transmitted efficiently through long lengths of wire .... The transmission to distant places of a multiplication of musical performances are objects of *far less importance* than *the conveyance* of *articulations of speech*."

In 1823, Wheatstone explained how by means of a long deal rod he had connected a lyre in one room with another lyre placed in an upper room, and how when one instrument was played upon, the same strains were reproduced in the other instrument. This mysterious reproduction of music was a constant source of wonder to the public, who called the sounding instrument "the enchanted lyre." But Wheatstone christened it "the telephone," and thus coined a word now in daily use. Then in 1827 he coined the word "microphone," in describing "an instrument which from its rendering audible the weakest sounds, may with propriety be named the microphone." Wheatstone's musical "telephone" or "enchanted lyre" attracted so much attention that the editor of the *Repository of Arts* suggested in the issue of September 1, 1821,

that the day may come when "the music of an opera (may be conveyed) like gas through snug conductors from the main laboratory of harmony to distant parts of the metropolis."

In his lecture before the Society of Arts in London, in November, 1877, Graham Bell referred to some of Wheatstone's "early telephonic experiments," as well as to all important experiments in telephony made prior to the conception of his theory.

While in London Graham Bell endeavored to have a handsome pair of telephones made for the Queen, but failing to secure what he desired, he wrote a letter to Thomas A. Watson, reading in part as follows:

"Dear Mr. Watson: .... Mr. Williams would be quite flattered if he could only know how he has risen in my estimation since I came here, and how I appreciate, as I never did before, the kindness in giving me facilities for the execution of my ideas, and his good sense in forwarding, even at considerable trouble, the efforts of inventors, instead of discouraging inventions as much as possible. This brings me to the object of this letter, which is to request you to help me in developing some new ideas, and to ask you to have some work done for me in America. In the first place, we cannot have a decent telephone made in England—not even for Queen Victoria herself. I send you in despair the telephones made for Her Majesty, and ask you to make them work even respectably well, and reforward them here .... I cannot believe that ivory is any less suitable for telephonic purposes than ebonite, for its physical properties are the same, and I therefore send Her Majesty's telephones to you for your inspection."

Now a few words about the personality of the man and the esteem in which he was held during this period. The New York *Evening Post* of May 16, 1877, contains an interesting reference to his work, reading in part: "Professor Bell is a man of most genial and kindly presence, so courteous and gracious in manner that you could not feel yourself an intruder though you chanced to drop into his room when some private class was under special training. At the same time though his affability sets you at ease, you could not fail to observe that he is one of the busiest of men, so intent upon the development of the plans which occupy his life that he has no leisure for visitors who are not interested in his work. He is young, apparently not more than five and thirty (he was just thirty), with an unusually prepossessing countenance, very happy in its expression; of pale complexion, with jet black hair brushed up from his forehead, and pleasant, sparkling black

eyes—the face of a man all engaged in his work and finding satisfaction in it."

Another estimate of Graham Bell's personality by Philip R. Fowle reads: "The immense popularity the great inventor attained among all classes—scientists, business men, and particularly, his deaf-mute scholars—while teaching in the Horace Mann School at Boston, is a fair index to the lovable character of the man. Of the industry, cheerfulness, patience, and loving interest in the welfare of his afflicted pupils, tales without number are told, and it was due as much to these attributes as to any other one thing that his brother scientists so spontaneously proffered him the aid of the deductions they had drawn from experiments along lines similar to the ones he was following."

That Graham Bell appreciated this kindly feeling that was prevalent among those with whom he came in contact in the days when discouragement and derision appeared to be the only reward the future held in store for him, is shown in his public expressions gratefully acknowledging the assistance so generously rendered. On several occasions he publicly referred not only to the personal generosity of Professor Lewis B. Monroe, but to his nobility of character, and to the fact that by reason of his professional ability "every articulation teacher, whether a teacher of the deaf or a teacher of the hearing, should remember with gratitude the labors of Professor Monroe."

In addressing the Society of Telegraph Engineers, in London, on October 31, 1877, Graham Bell said, in naming certain friends: "And here I wish to express my indebtedness to several scientific friends in America for their co-operation and assistance .... The very honorable way in which they from time to time placed before me the results of their discoveries entitles them to my warmest thanks and to my highest esteem. Professor Pierce was the first to demonstrate the extreme smallness of the magnets which might be employed."

Again when telling the members of the American Association for the Advancement of Science that he and Sumner Tainter had demonstrated that "without the use of a conducting wire as in electric telephony, we can speak from station to station, wherever we can project a beam of light," Graham Bell said: "I am extremely glad that I have had the opportunity of making the first publication of these researches before a scientific society, for it is from scientific men that my work of the last six years

has received its earliest and kindest recognition. I gratefully remember the encouragement which I received from the late Professor Henry, at a time when the speaking telephone existed only in theory. Indeed, it is greatly due to the stimulus of his appreciation that the telephone became an accomplished fact. I cannot state too highly, also, the advantage I derived in preliminary experiments on sound vibrations in this building from Professor Cross, and near here from my valued friend Dr. Clarence J. Blake. When the public were incredulous of the possibility of electrical speech, the American Academy of Arts and Sciences, the Philosophical Society of Washington, and the Essex Institute of Salem, recognized the reality of the results and honored me by their congratulations. The public interest, I think, was first awakened by the judgment of the very eminent scientific men before whom the telephone was exhibited in Philadelphia, and by the address of Sir William Thomson before the British Association for the Advancement of Science. At a later period when every practical telegrapher considered the telephone as a mere toy, several scientific gentlemen, Prof. John Pierce, Prof. Eli W. Blake, Dr. Channing, Mr. Clark, and Mr. Jones of Rhode Island, devoted themselves to a series of experiments for the purpose of assisting me in making the telephone of practical utility, and they communicated to me from time to time, the results of their experiments with a kindness and generosity I can never forget. It is not only pleasant to remember these things and to speak of them, but it is a duty to repeat them, as they give a practical refutation to the often repeated stories of the blindness of scientific men to unaccredited novelties, and of their jealousy of unknown inventors who dare to enter the charmed circle of science."

(*To be continued.*)

SPECIAL REPORT UPON THE DEAF, BASED ON THE RETURNS OF THE TWELFTH CENSUS.[1]

PREPARED BY ALEXANDER GRAHAM BELL, AS EXPERT SPECIAL AGENT OF THE CENSUS OFFICE.

(*Continued from page* 364.)

Occupations.—The same classification of occupations was adopted for the deaf as was used for the general population at the Twelfth Census. A comparison is therefore possible of the deaf and of the total population 10 years of age and over gainfully employed.

	Total number 10 years of age and over.	Number gainfully employed.	Per cent.
Total population	57,949,824	29,073,233	50.2
The deaf	83,388	32,142	38.5

These figures indicate that deafness is a drawback to some extent in securing employment; but they also show that the deaf as a class are by no means a burden upon the community. Few of the deaf who are under 20 years of age are engaged in gainful occupations (Table LXXII); but this is no discredit to them, for the vast majority of these cases are attending school (Table LXIV). Of those over 20 years of age 43 per cent are engaged in gainful occupations—for Table LIX shows a total of 70,602 who are over 20 years of age, and Table LXXIII shows that 30,353 of these, or 43 per cent, are engaged in gainful occupations.

Table LXVI shows the number and per cent of the deaf in each occupation contrasted with the per cent of the total population in each group.

[1] A reprint of "Special Reports: the Blind and the Deaf," in the part relating to the Deaf; issued by the Department of Commerce and Labor, Bureau of the Census, Washington, 1906. Commenced in the October, 1906, number of the REVIEW and concluded in this number. For "General Tables," 1 to 47 inclusive—omitted from this republication—see the original volume.

TABLE LXVI.—*Number and per cent of deaf and per cent of total population in each group of occupations.*

CLASS OF OCCUPATIONS.	THE DEAF.		Per cent of total population.
	Number.	Per cent.	
All occupations	32,142	100.0	100.0
Agricultural pursuits	14,068	43.8	35.7
Manufacturing and mechanical pursuits	9,442	29 4	24.4
Domestic and personal service	5,316	16.5	19.2
Trade and transportation	2,236	6.9	16.4
Professional service	1,080	3.4	4.3

Of the deaf gainfully employed, 89.7 per cent are found in the three groups in which perfect or even partial hearing is not essential, while in the two remaining groups—trade and transportation and professional service—which require hearing and speaking power, only a small proportion of the deaf (10.3 per cent) report employment.

That the degree of deafness considerably affects the occupation is shown in Table LXVII.

TABLE LXVII.—*Number and per cent of the deaf in each group of occupations, by degree of deafness.*

CLASS OF OCCUPATIONS.	TOTAL.		DEGREE OF DEAFNESS.			
			Totally deaf.		Partially deaf.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
All occupations	32,142	100.0	12,678	39.4	19,467	60.6
Agricultural pursuits	14,068	100.0	4,761	33.8	9,307	66.2
Manufacturing and mechanical pursuits	9,442	100.0	4,583	48 5	4,859	51.5
Domestic and personal service	5,316	100.0	2,395	45.1	2,921	54.9
Trade and transportation	2,236	100.0	552	24.6	1,684	75.4
Professional service	1,080	100.0	387	35.8	693	64.2

The percentage for professional service is high because it includes teachers, professors in colleges, etc., and artists and teachers of art. The teachers show a very large per cent totally deaf (206 out of 294), the majority of whom probably are instructors in schools for the deaf. In nearly every other kind of professional service the totally deaf constitute a very small minority.

Table LXVIII shows the obvious connection between school attendance and the opportunity for obtaining gainful employment.

TABLE LXVIII.—*Number and per cent of the deaf and of the deaf gainfully employed, classified according to schooling.*

	TOTAL NUMBER OF DEAF.		DEAF GAINFULLY EMPLOYED.	
	Number.	Per cent.	Number.	Per cent.
Aggregate	89,287	100.0	32,142	100.0
Schooling	65,717	73.6	26,030	81 0
No schooling	13,557	15.2	3,950	12.3
Not stated	10,013	11.2	2,162	6.7

The deaf who have attended school show a much larger per cent of their number pursuing gainful occupations than of those who have not attended school.

The kind of employment—whether skilled or unskilled—is also largely determined by school attendance. In Table LXIX the number in each group of occupations is distributed according to schooling.

TABLE LXIX.—*Number and per cent of deaf gainfully employed, by class of occupations, in relation to schooling.*

CLASS OF OCCUPATIONS.	DISTRIBUTION ACCORDING TO SCHOOLING.							
	Total.		Schooling.		No schooling.		Not stated.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
All occupations	32,142	100.0	26,030	81.0	3,950	12.3	2,162	6.7
Agricultural pursuits	14,068	100.0	10,668	75.8	2,294	16.3	1,106	7.9
Professional service	1,080	100.0	1,037	96.0	16	1.5	27	2.5
Domestic and personal service	5,316	100.0	3,903	73.4	988	18.6	425	8.0
Trade and transportation	2,236	100.0	1,979	88.5	119	5.3	138	6.2
Manufacturing and mechanical pursuits	9,442	100.0	8,443	89.4	533	5.7	466	4.9

Those engaged in professional service, manufacturing and mechanical pursuits, and trade and transportation show a very large percentage of their number schooled, ranking in this respect in the order named; while those in agricultural pursuits show next lowest, and those in domestic and personal service, the smallest percentage schooled. In the last two classes of occupations lack of schooling is no great drawback, while in the remaining three it is almost a total disqualification.

Unfortunately for purposes of comparison, the kind of school was not stated in over one-third of the cases. This failure to state kind of school was particularly marked among those in agricultural and in manufacturing and mechanical pursuits.

In Tables LXXII, LXXIII, and LXXIV the occupations of the deaf are given in detail.

Table LXX shows the deaf, by present age (10 and over, and 20 and over), period of life when deafness occurred, and degree of deafness, giving the number and percentage of each class who are employed in gainful occupations.

TABLE LXX.—*The number and per cent of the deaf 10 years of age and over gainfully employed, classified by present age, period of life when deafness occurred, and degree of deafness.*

PRESENT AGE, PERIOD OF LIFE WHEN DEAFNESS OCCURRED, AND DEGREE OF DEAFNESS.	Total.	GAINFULLY EMPLOYED.	
		Number.	Per cent.
Present age 10 years and over	83,388	32,142	38.5
Period of life when deafness occurred:			
Childhood (under 20)	44,549	18,073	40.6
Adult life (20 and over)	35,825	13,172	36.8
Unknown	3,014	897	29.8
Degree of deafness:			
Totally deaf	32,831	12,678	38.1
Partially deaf	50,557	19,464	38.5
Present age 20 years and over	70,602	30,353	43.0
Period of life when deafness occurred:			
Childhood (under 20)	31,763	16,405	51.6
Adult life (20 and over)	35,825	13,172	36.8
Unknown	3,014	776	25.7
Degree of deafness:			
Totally deaf	23,272	11,670	50.1
Partially deaf	47,330	18,683	39.5

From this table it appears that the deaf from childhood are more self-supporting than the deaf from adult life.

This is specially surprising when we consider the fact that the deaf from childhood include practically all of the deaf and dumb, and that most of them are totally deaf; whereas the deaf from adult life include none of the deaf and dumb (at least substantially none), and most of them are only partially deaf.

Of the deaf from childhood who were over 10 years of age, 40.6 per cent were gainfully employed, and of the deaf from adult life only 36.8 per cent (Table LXX).

These figures, however, do not fully express the discrepancy between the two classes in this respect; for all of the deaf from adult life were, of course, 20 years of age or over, because they did not lose hearing until after reaching that age; whereas many of the deaf from childhood (12,786) were between 10 and 20 years of age, and comparatively few of these were earning their livelihood, because most were in school.

Of the deaf from childhood who were 20 years of age or over, the majority (51.6 per cent) were gainfully employed, against 36.8 per cent of the deaf from adult life (Table LXX).

Of the totally deaf who were 20 years of age or over (most of whom were deaf from childhood) 50.1 per cent were earning their livelihood, but only 39.5 per cent of the partially deaf (most of whom became deaf in adult life). (Table LXX.)

The deaf from adult life are undoubtedly better equipped by nature for the task of earning a livelihood, for most of them possess perfect speech and partial hearing; and yet the deaf from childhood seem to be more successful in this respect.

The explanation for this apparently anomalous condition of affairs seems to lie in the fact that many persons who become deaf in adult life fail to accommodate themselves to the new condition of deafness. They lose their positions on account of increasing deafness; and feeling themselves to be too old to begin life all over again in their crippled condition by seeking some new occupation with which deafness would not interfere, they lose heart and drop out of the struggle, becoming dependent upon their friends for support, or living upon the savings of former years, without entering into new pursuits.

In the case of the deaf from childhood, however, the accommodation to the environment has become complete before the dawn of adult life. Many of these persons have never experienced any other condition than that of deafness; and most of them enter upon the duties and responsibilities of adult life with that feeling of buoyancy and hope that is so characteristic of youth.

Nor should we neglect to notice in this connection the powerful influence exerted on the deaf from childhood by the special schools which have been established for their benefit.

The sentiment is very early instilled into their minds that these schools are not in any sense "asylums" or "charitable institutions," but simply "schools" for their education, analogous to the ordinary public schools of the country; and that they themselves are not—and never should be—objects of charity. The spirit of dependence is discouraged; and every effort made to stimulate a spirit of independence and self-help. The pupils are led to believe that it is the duty of every deaf boy and girl to learn some means of livelihood; and that a stigma attaches to those who become a burden upon their friends or the public.

Sentiment counts for a great deal with the young; but the special schools go further than this by providing manual training and art instruction for advanced pupils.[1]

These schools very generally teach the use of tools and give manual training in the form of sloyd. Mechanical drawing, too, and art instruction are given to those who manifest abilities in these lines. Many of our schools support special trade shops in which specific occupations are taught, like shoemaking, cabinet-making, etc., although it is perhaps doubtful whether this specialization of manual training during school life is of as much value to the deaf as instruction of a more general character, embracing elements that are common to a number of trades. Comparatively few of the deaf from childhood pursue in adult life the specific occupations they were taught in school; and the very great variety in the occupations actually pursued seems to render diversity rather than specialization a desirable aim during the school period, leaving specialization into a specific occupation to come later in life, through actual work in ordinary shops, which are more likely to be up-to-date in their

[1] *Industries taught in American schools for the deaf.*—Architectural drawing, art, baking, barbering, basket making, blacksmithing, bookbinding, bricklaying, broom making, cabinetmaking, calcimining, carpentry, chalk engraving, cementing, chair making, china painting, construction work, cooking, clay modeling, coopery, domestic science, drawing, dressmaking, electricity, embroidery, engineering, fancy work, farming, floriculture, gardening, glazing, handicraft, harness making, house decoration, half-tone engraving, housework, horticulture, illuminating, ironing, knitting, lace making, manual training, mattress making, millinery, needlework, painting, paper hanging, plastering, plate engraving, photography, printing, pyrography, raffia, sewing, shoemaking, sign painting, sloyd, stone laying, tailoring, tinwork, typewriting, venetian iron work, weaving, wood carving, wood engraving, wood turning, wood working, working in iron, and the use of tools.—[From the American Annals of the Deaf.]

methods of work than the trade shops of the schools, which do not feel the stimulating effects of competition.

The Census tables relating to occupation reveal the astonishing fact that there are extremely few occupations pursued by the people of the United States in which deaf persons do not find employment. This is not only surprising, but at the same time encouraging, as widening the scope of possible usefulness for the deaf.

There can be no question that the industrial training provided by our special schools has been of material assistance to their pupils in securing employment in adult life, and it is specially worthy of notice in this connection that very many of the deaf from childhood have had the opportunity of taking this training, whereas hardly any of the deaf from adult life have attended special schools.

Out of 35,924 persons who became deaf in adult life, only 135 attended special schools; whereas out of 50,296 persons deaf from childhood, 25,071 received training in special schools (including 225 who attended both special and other schools). (Table 2.)

From this it appears probable that our special schools for the deaf are mainly responsible for the fact that the deaf from childhood no longer constitute a dependent class. The majority, or 51.6 per cent, are gainfully employed in adult life. The percentage rightfully entitled to be regarded as self-supporting is even larger than this, for the chief occupation reported by married females ("keeping house") has not been included among gainful occupations.

TABLE LXXI.—*The number and per cent of the deaf 10 years of age and over gainfully employed, classified by ability to speak and degree of deafness.*

ABILITY TO SPEAK AND DEGREE OF DEAFNESS.	Total.	GAINFULLY EMPLOYED.	
		Number.	Per cent.
The deaf 10 years of age and over	83,388	32,142	38.5
Ability to speak:			
Well	54,506	21,274	39.0
Imperfectly	8,152	2,722	33.4
Not at all	20,730	8,146	39.3
Totally deaf	32,831	12,678	38.1
Ability to speak:			
Well	7,727	3,094	40.0
Imperfectly	5,084	1,626	32.0
Not at all	20,020	7,958	34.7
Partially deaf	50,557	19,464	38.5
Ability to speak:			
Well	46,779	18,180	38.9
Imperfectly	3,068	1,096	35.7
Not at all	710	188	26.5

Table LXXI shows the deaf who are 10 years of age or over, by ability to speak and degree of deafness; giving the number and percentage of each class who are employed in gainful occupations.

Out of 62,658 deaf persons 10 years of age or over who were able to speak, 23,996, or 38.3 per cent, were employed in gainful occupations. Out of 20,730 deaf persons who were unable to speak, 8,146, or 39.3 per cent, were gainfully employed (Table LXXI).

It thus appears that the deaf and dumb, as a class, are more self-supporting than the deaf who speak.

This is rather a startling conclusion; and it is very easy to draw false inferences from the fact. It can hardly be doubted that the deaf who speak, even imperfectly, have some advantage over those who can not speak at all; so that it is obvious that the above result arises, not from the difference of speaking power, but from other differences not specified in the table.

The fact of the matter is that all of the deaf and dumb were deaf from childhood; whereas the majority of the deaf who speak lost hearing in adult life. The deaf from adult life are inferior in self-supportng power—not, of course, because they can speak, but because of other conditions referred to more particularly in remarks concerning Table LXX; and the deaf and dumb are superior in this respect—not because they are dumb, but because of the industrial training they have received in special schools.

In order to ascertain the influence of speech upon employment, we should eliminate the deaf from adult life and study the occupations of the deaf from childhood who speak well, imperfectly, or not at all, so as to have no other substantial point of difference between the classes considered, excepting their ability to speak. Unfortunately the tabulated returns do not give us the information desired.

We can ascertain the period of life when deafness occurred, and the present age, of the deaf who speak well, imperfectly, or not at all; and also of the deaf who are gainfully employed, but we have no tables correlating the results. We may gain some light upon the subject, however, from the consideration of the fact that the totally deaf consist mainly of persons deaf from childhood, so that the totally deaf cases noted in Table LXXI were probably all deaf from childhood. Of those who could speak well, 40 per cent were employed in gainful occupations; whereas only 34.7 per cent of those who were deaf and dumb were gainfully employed. The ability to speak well was evidently of advantage.

The advantage is not so obvious in the case of the totally deaf

who speak imperfectly, of whom only 32 per cent were gainfully employed. It should be remembered, however, that in these cases we are dealing largely with persons who have acquired speech artificially by instruction in school, and that the table includes many persons who are between 10 and 20 years of age.

Articulation teaching is of so comparatively recent origin that most of the deaf who have acquired speech artificially by instruction in schools are still quite young, few having passed middle life; whereas the deaf and dumb, and the deaf who speak well, contain persons of all ages—even up to extreme old age.

The difference between the three classes in respect to age may be illustrated by taking the aggregates given in Table LXXI (composed of persons 10 years of age or over), and showing the number and percentage who are 20 years of age or over:

CLASS.	10 years of age and over.	20 years of age and over.	Percentage 20 years of age and over.
Aggregate gainfully employed	32,142	30,353	94.4
Speak well	54,506	51,376	94.2
Imperfectly	8,152	4,809	59.0
Not at all	20,730	14,419	69.5

As more than 94 per cent of the aggregate gainfully employed are 20 years of age or over, it follows that the number 20 years of age or over who are gainfully employed among the three classes named (the deaf who speak well, imperfectly, or not at all) would be only slightly changed from the figures of the table (Table LXXI); but the percentage gainfully employed would be considerably increased in the case of the deaf who speak imperfectly—in fact, almost doubled—because it would be based upon a smaller total little more than half its former value (59 per cent).

Not only does ability to speak affect the opportunity for engaging in pursuits in general, but it also, in a large measure, determines the choice of occupation. The following percentages are taken from Table 47, and show the percentage of the deaf who speak well, imperfectly, or not at all, who are engaged in the principal groups of occupations:

OCCUPATION.	ABILITY TO SPEAK.		
	Well.	Imperfectly.	Not at all.
All occupations	100.0	100.0	100.0
Agricultural pursuits	46.1	40.9	38.6
Professional service	4.1	2.5	1.8
Domestic and personal service	14.7	19.3	20.4
Trade and transportation	8.8	3.6	3.3
Manufacturing and mechanical pursuits	26.3	33.7	35.9

The advantage of speech is most manifest in agricultural pursuits, professional service, and trade and transportation; the percentage employed in these occupations being greatest among those who speak well, least among those who do not speak at all, and intermediate among those who speak imperfectly. On the other hand, speech does not seem to be of so much consequence in domestic and personal service and manufacturing and mechanical pursuits, the order of the percentages being reversed.

TABLE LXXII.—THE DEAF, 10 YEARS OF AGE AND OVER, ENGAGED IN EACH OCCUPATION AND CLASS OF OCCUPATIONS, BY AGE WHEN DEAFNESS OCCURRED.

OCCUPATION.	Total.	AGE WHEN DEAFNESS OCCURRED.														
		Unknown.	Indefinitely stated.	Definitely stated.	Birth.	After birth, under 2.	2 and under 5.	Under 5.	5 and under 10.	10 and under 15.	15 and under 20.	Under 20.	20 and under 40.	40 and under 60.	60 and under 80.	80 and over.
All occupations	32,142	897	1,104	30,141	4,086	2,053	4,003	10,142	3,105	2,118	2,098	17,463	7,227	3,579	1,756	116
Agricultural pursuits	14,068	382	498	13,188	1,871	809	1,324	4,004	1,116	853	838	6,811	3,287	1,937	1,071	82
Agricultural laborers	2,016	50	72	1,894	635	208	313	1,156	230	134	85	1,605	169	81	37	2
Dairymen and dairywomen	29	.....	.....	29	.....	1	.....	1	4	1	2	8	15	4	1	1
Farmers, planters, and overseers	11,428	306	404	10,718	1,196	577	969	2,742	843	667	700	4,952	2,951	1,762	978	75
Gardeners, florists, nurserymen, etc	330	16	17	297	20	6	20	46	18	23	20	107	86	61	40	3
Lumbermen and raftsmen	51	.....	1	50	5	3	7	15	4	6	6	31	13	5	1	.....
Stock raisers, herders, and drovers	147	3	2	142	7	12	13	32	15	15	15	77	40	17	7	.....
Turpentine farmers and laborers	4	1	.....	3	.....	.....	.....	.....	.....	.....	3	3	.....	.....	.....	.....
Wood choppers	52	6	2	44	8	2	1	11	1	5	6	23	8	7	6	.....
Other agricultural pursuits	11	.....	.....	11	.....	.....	1	1	1	2	1	5	5	.....	1	.....
Professional service	1,080	30	44	1,006	59	44	127	230	144	94	70	538	288	120	56	4
Actors, professional showmen, etc	23	2	1	20	.....	.....	5	5	4	2	2	13	6	.....	1	.....
Architects, designers, draftsmen, etc	46	.....	1	45	1	2	7	10	5	5	2	22	18	2	3	.....
Artists and teachers of art	114	2	2	110	10	11	32	53	20	12	4	89	16	4	1	.....
Clergymen	116	2	9	105	1	1	5	7	9	8	6	30	33	25	14	3
Dentists	20	.....	2	18	.....	1	2	3	1	2	2	8	8	2	.....	.....
Electricians	18	1	.....	17	1	.....	2	3	2	1	.....	6	10	1	.....	.....
Engineers (civil, etc.) and surveyors	43	2	.....	41	1	.....	.....	1	2	3	9	15	13	9	4	.....
Journalists	54	2	2	50	.....	1	3	4	11	9	4	28	18	4	.....	.....
Lawyers	90	4	3	83	.....	1	2	3	3	5	6	17	41	14	10	1
Literary and scientific persons	40	1	1	38	1	.....	2	3	6	2	3	14	16	7	1	.....
Musicians and teachers of music	39	1	4	34	1	.....	3	4	2	5	8	19	12	3	.....	.....
Officials (government)	62	4	1	57	3	.....	2	5	7	2	8	22	18	15	2	.....
Physicians and surgeons	106	4	6	96	1	.....	4	5	4	3	8	20	37	27	12	.....
Teachers and professors in colleges, etc	294	5	11	278	39	27	57	123	64	34	8	229	35	6	8	.....
Other professional service	15	.....	1	14	.....	.....	1	1	4	1	.....	6	7	1	.....	.....
Domestic and personal service	5,316	187	195	4,934	856	336	720	1,912	588	369	345	3,214	1,095	444	170	11
Barbers and hairdressers	122	3	1	118	12	19	31	62	13	7	7	89	21	6	2	.....
Bartenders	9	.....	1	8	.....	1	.....	1	1	1	3	6	2	.....	.....	.....
Boarding and lodging house keepers	125	4	7	114	3	1	4	8	7	8	5	28	55	27	3	1
Hotel keepers	96	1	6	89	3	1	5	9	6	3	3	21	33	21	14	.....
Housekeepers and stewards	230	7	10	213	35	16	30	81	26	9	12	128	60	18	7	.....
Janitors and sextons	74	3	4	67	4	2	4	10	3	4	6	23	31	11	2	.....
Laborers (not specified)	2,718	98	96	2,524	424	187	386	997	291	175	178	1,641	546	229	101	7
Launderers and laundresses	452	19	12	421	63	12	59	134	57	47	35	273	102	36	10	.....
Nurses and midwives	57	4	2	51	2	3	4	9	3	1	4	17	18	8	8	.....
Restaurant keepers	21	.....	.....	21	.....	1	3	4	3	1	3	11	6	3	1	.....
Saloon keepers	26	3	1	22	1	.....	.....	1	2	1	3	7	5	9	1	.....
Servants and waiters	1,303	42	48	1,213	301	92	188	581	172	101	80	934	191	69	17	2
Soldiers, sailors, and marines (U. S.)	3	.....	.....	3	.....	.....	.....	.....	.....	.....	2	2	1	.....	.....	.....
Watchmen, policemen, firemen, etc	48	3	5	40	2	.....	2	4	2	5	1	12	18	5	4	1
Other domestic and personal service	32	.....	2	30	6	1	4	11	2	6	3	22	6	2	.....	.....
Trade and transportation	2,236	61	92	2,083	129	76	206	411	187	171	226	995	661	304	117	6
Agents	231	10	14	207	14	4	15	33	11	17	21	82	68	39	17	1
Bankers and brokers	119	4	8	107	3	2	4	9	5	6	8	28	37	20	20	2
Boatmen and sailors	45	1	2	42	2	.....	4	6	3	2	5	16	11	8	7	.....
Bookkeepers and accountants	124	3	4	117	5	3	6	14	17	17	12	60	38	15	4	.....
Clerks and copyists	263	1	10	252	20	18	32	70	30	25	33	158	70	20	4	.....
Commercial travelers	33	1	2	30	3	2	2	7	4	1	5	17	10	3	.....	.....
Draymen, hackmen, teamsters, etc	206	10	7	189	18	8	24	50	18	16	17	101	58	25	5	.....
Foremen and overseers	3	.....	.....	3	.....	.....	2	2	1	.....	.....	3	.....	.....	.....	.....
Hostlers	47	3	1	43	10	1	11	22	3	3	4	32	9	.....	2	.....
Hucksters and peddlers	66	1	4	61	7	1	6	14	7	6	6	33	14	9	5	.....
Livery stable keepers	30	1	1	28	.....	1	3	4	2	3	3	12	9	6	1	.....
Merchants and dealers (except wholesale)	710	13	28	669	21	20	51	92	48	48	82	270	230	123	45	1
Merchants and dealers (wholesale)	7	.....	.....	7	1	.....	.....	1	1	.....	.....	2	4	.....	1	.....
Messengers and errand and office boys	13	2	.....	11	1	1	1	3	.....	4	.....	7	3	1	.....	.....
Officials of banks and companies	22	2	1	19	.....	.....	2	2	1	1	1	5	9	3	1	1
Packers and shippers	26	1	.....	25	2	3	7	12	5	4	.....	21	3	1	.....	.....
Porters and helpers (in stores, etc.)	39	.....	1	38	10	2	4	16	5	2	2	25	10	1	1	1
Salesmen and saleswomen	77	4	4	69	6	3	13	22	4	4	7	37	21	11	.....	.....
Steam railroad employees	106	3	4	99	3	3	8	14	13	8	12	47	37	11	4	.....
Stenographers and typewriters	15	.....	.....	15	.....	2	3	5	3	1	4	13	1	1	.....	.....
Street railway employees	1	.....	.....	1	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....

Laborers (not specified)	2,718	98	96	2,524	424	187	386	997	291	175	178	1,641	546	229	101	7
Launderers and laundresses	452	19	12	421	63	12	59	134	57	47	35	273	102	36	10	.....
Nurses and midwives	57	4	2	51	2	3	4	9	3	1	4	17	18	8	8	.....
Restaurant keepers	21	.....	.....	21	.....	1	3	4	3	1	3	11	6	3	1	.....
Saloon keepers	26	3	1	22	1	.....	.....	1	2	1	3	7	5	9	1	.....
Servants and waiters	1,303	42	48	1,213	301	92	188	581	172	101	80	934	191	69	17	2
Soldiers, sailors, and marines (U. S.)	3	.....	.....	3	.....	.....	.....	.....	.....	.....	2	2	1	.....	.....	.....
Watchmen, policemen, firemen, etc	48	3	5	40	2	.....	2	4	2	5	1	12	18	5	4	1
Other domestic and personal service	32	.....	2	30	6	1	4	11	2	6	3	22	6	2	.....	.....
Trade and transportation	2,236	61	92	2,083	129	76	206	411	187	171	226	995	661	304	117	6
Agents	231	10	14	207	14	4	15	33	11	17	21	82	68	39	17	1
Bankers and brokers	119	4	8	107	3	2	4	9	5	6	8	28	37	20	20	2
Boatmen and sailors	45	1	2	42	2	.....	4	6	3	2	5	16	11	8	7	.....
Bookkeepers and accountants	124	3	4	117	5	3	6	14	17	17	12	60	38	15	4	.....
Clerks and copyists	263	1	10	252	20	18	32	70	30	25	33	158	70	20	4	.....
Commercial travelers	33	1	2	30	3	2	2	7	4	1	5	17	10	3	.....	.....
Draymen, hackmen, teamsters, etc	206	10	7	189	18	8	24	50	18	16	17	101	58	25	5	.....
Foremen and overseers	3	.....	.....	3	.....	.....	2	2	1	.....	.....	3	.....	.....	.....	.....
Hostlers	47	3	1	43	10	1	11	22	3	3	4	32	9	.....	2	.....
Hucksters and peddlers	66	1	4	61	7	1	6	14	7	6	6	33	14	9	5	.....
Livery stable keepers	30	1	1	28	.....	1	3	4	2	3	3	12	9	6	1	.....
Merchants and dealers (except wholesale)	710	13	28	669	21	20	51	92	48	48	82	270	230	123	45	1
Merchants and dealers (wholesale)	7	.....	.....	7	1	.....	.....	1	1	.....	.....	2	4	.....	1	.....
Messengers and errand and office boys	13	2	.....	11	1	1	1	3	.....	4	.....	7	3	1	.....	.....
Officials of banks and companies	22	2	1	19	.....	.....	2	2	1	1	1	5	9	3	1	1
Packers and shippers	26	1	.....	25	2	3	7	12	5	4	.....	21	3	1	.....	.....
Porters and helpers (in stores, etc.)	39	.....	1	38	10	2	4	16	5	2	2	25	10	1	1	1
Salesmen and saleswomen	77	4	4	69	6	3	13	22	4	4	7	37	21	11	.....	.....
Steam railroad employees	106	3	4	99	3	3	8	14	13	8	12	47	37	11	4	.....
Stenographers and typewriters	15	.....	.....	15	.....	2	3	5	3	1	4	13	1	1	.....	.....
Street railway employees	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Telegraph and telephone linemen	3	.....	.....	3	.....	.....	1	1	.....	.....	1	2	1	.....	.....	.....
Telegraph and telephone operators	16	.....	.....	16	.....	.....	1	1	.....	1	2	4	11	1	.....	.....
Undertakers	13	.....	.....	13	1	.....	1	2	1	1	.....	4	4	5	.....	.....
Other persons in trade and transportation	21	1	1	19	2	2	5	9	5	1	1	16	2	1	.....	...
Manufacturing and mechanical pursuits	9,442	237	275	8,930	1,171	788	1,626	3,585	1,070	631	619	5,905	1,896	774	342	13
Building trades	2,000	63	69	1,868	165	123	266	554	178	122	148	1,002	494	240	129	3
Carpenters and joiners	1,121	41	40	1,040	82	63	135	280	82	62	71	495	282	161	99	3
Masons (brick and stone)	203	7	5	191	15	7	12	34	18	20	21	93	56	26	16	.....
Painters, glaziers, and varnishers	399	10	10	379	42	40	82	164	50	24	27	265	76	31	7	.....
Paper hangers	30	.....	1	29	.....	.....	5	5	5	3	4	17	11	1	.....	.....
Plasterers	59	1	4	54	1	1	7	9	8	3	5	26	21	5	2	.....
Plumbers and gas and steam fitters	20	1	1	18	2	1	.....	3	4	3	3	13	4	1	.....	.....
Roofers and slaters	7	1	.....	6	.....	.....	.....	.....	.....	.....	2	2	3	1	.....	.....
Mechanics (not otherwise specified)	161	2	8	151	23	11	25	59	11	7	14	91	41	14	5	.....
Chemicals and allied products	20	.....	2	18	1	1	1	3	4	1	1	9	4	5	.....	.....
Oil well and oil works employees	16	.....	1	15	.....	.....	1	1	3	1	1	6	4	5	.....	.....
Other chemical workers	4	.....	1	3	1	1	.....	2	1	.....	.....	3	.....	.....	.....	.....
Clay, glass, and stone products	129	3	.....	126	16	9	26	51	13	9	9	82	27	11	6	.....

Oil well and oil works employees	16		1	15			1	1	3	1	1	6	4	5	
Other chemical workers	4		1	3	1	1		2	1			3			
Clay, glass, and stone products	129	3		126	16	9	26	51	13	9	9	82	27	11	6
Brick and tile makers, etc	26	2		24	5	2	5	12	4	1		17	5	1	1
Glassworkers	24	1		23	3	3	3	9	3	3	3	18	4		1
Marble and stone cutters	70			70	6	3	15	24	5	5	5	39	17	10	4
Potters	9			9	2	1	3	6	1		1	8	1		
Fishing and mining	350	7	1	342	38	17	34	89	34	32	37	192	92	33	25
Fishermen and oystermen	85	2		83	16	3	3	22	6	7	9	44	25	7	7
Miners and quarrymen	265	5	1	259	22	14	31	67	28	25	28	148	67	26	18
Food and kindred products	297	11	10	276	21	26	35	82	30	22	32	166	72	30	8
Bakers	103	3	1	99	11	14	20	45	13	6	10	74	16	6	3
Butchers	91	4	3	84	4	7	5	16	11	12	9	48	26	10	
Butter and cheese makers	6			6	1			1		1	1	3	2	1	
Confectioners	36	1	1	34	1	2	4	7	3	3	6	19	9	5	1
Millers	49	3	3	43	1	2	3	6	2		5	13	18	8	4
Other food preparers	12		2	10	3	1	3	7	1		1	9	1		
Iron and steel and their products	869	37	22	810	77	42	119	238	85	59	75	457	228	84	39
Blacksmiths	348	17	9	322	23	9	18	50	28	21	38	137	115	42	26
Iron and steel workers	183	5	4	174	22	13	47	82	24	15	11	132	30	9	3
Machinists	216	7	4	205	21	16	34	71	24	16	15	126	51	21	7
Steam boiler makers	54	7	3	44	1		1	2	2	1	8	13	20	11	
Stove, furnace, and grate makers	7			7		2	2	4	1	1		6	1		
Tool and cutlery makers	26	1	2	23	4		7	11	3	2		16	6	1	
Wheelwrights	24			24	4	2	4	10	2	3	3	18	4		2
Wireworkers	11			11	2		6	8	1			9	1		1
Leather and its finished products	955	16	32	907	192	109	235	536	104	49	35	724	99	61	22
Boot and shoe makers and repairers	794	13	29	752	172	92	197	461	95	41	25	622	68	44	17
Harness and saddle makers and repairers	110	2	3	105	14	11	26	51	4	4	6	65	22	14	4
Leather curriers and tanners	41	1		40	4	5	10	19	3	4	3	29	9	1	1
Trunk and leather-case makers, etc	10			10	2	1	2	5	2		1	8		2	
Liquors and beverages	19		2	17	4	1	4	9	5	2		16	1		
Bottlers and soda water makers, etc	13		1	12	1		4	5	4	2		11	1		
Brewers and maltsters	3		1	2	1			1	1			2			
Distillers and rectifiers	3			3	2	1		3				3			
Lumber and its remanufactures	730	12	24	694	98	78	154	330	80	37	38	485	113	63	32
Cabinetmakers	180	2	4	174	29	30	47	106	25	7	6	144	14	8	8
Coopers	92	1		91	12	6	20	38	13	5	6	62	21	4	4
Saw and planing mill employees	110	3	5	102	15	3	17	35	10	8	7	60	24	11	7
Other woodworkers	348	6	15	327	42	39	70	151	32	17	19	219	54	40	13
Metals and metal products other than iron and steel	204	5	2	197	23	16	48	87	23	14	10	134	42	16	5
Brassworkers	19	2		17	3	1	6	10	2		3	15	1	1	
Clock and watch makers and repairers	35	1		34	4	5	8	17	2	1		20	9	4	1
Gold and silver workers	17	1		16	1	2	4	7	5		1	13	1	2	
Tin plate and tinware makers	65	1		64	6	4	10	20	10	7	3	40	19	4	1
Other metal workers	68		2	66	9	4	20	33	4	6	3	46	12	5	3
Paper and printing	606	12	11	583	113	99	164	376	94	40	18	528	43	8	4
Bookbinders	54		2	52	8	7	20	35	6	1	1	43	7	1	1
Boxmakers (paper)	18			18	2		8	10	2	3	1	16	2		
Engravers	27		1	26	3	5	6	14	8	1		23	3		
Paper and pulp mill operatives	31	2		29	5	4	7	16	1	1	1	19	8	2	
Printers, lithographers, and pressmen	476	10	8	458	95	83	123	301	77	34	15	427	23	5	3
Textiles	2,214	43	64	2,107	317	180	377	874	296	166	160	1,496	425	135	46
Bleachery and dye works operatives	13	1		12	1	1	1	3	2	1	1	7	3	2	
Carpet factory operatives	45		1	44	7	2	9	18	5	5	4	32	7	3	1
Cotton mill operatives	136	1	3	132	29	12	21	62	17	9	12	100	24	7	1
Hosiery and knitting mill operatives	31		2	29	5	4	6	15	2	2	1	20	5	2	2
Silk mill operatives	15			15	2	2	3	7	1	2	1	11	4		
Woolen mill operatives	86	6	2	78	8	6	10	24	14	9	6	53	17	6	2
Other textile mill operatives	24			24	3	2	4	9	3	2	1	15	5	2	2
Dressmakers	706	10	22	674	80	51	116	247	99	57	62	465	166	35	8
Hat and cap makers	26	1	1	24	2	1	9	12	4	3	2	21	1	2	
Milliners	53	3	2	48	4	2	8	14	6	8	1	29	15	3	1
Seamstresses	604	14	22	568	93	43	92	228	83	36	42	389	124	44	9
Shirt, collar, and cuff makers	34	1		33	9	3	10	22	5	2	1	30	3		
Tailors and tailoresses	402	6	7	389	71	49	84	204	53	23	23	303	44	24	17
Other textile workers	30		2	37	3	2	4	9	2	7	3	21	7	5	3
Miscellaneous industries	1,049	28	36	985	106	87	163	356	124	78	56	614	256	88	26
Broom and brush makers	45	2		43	5	3	8	16	9	2	3	30	11	1	1
Charcoal, coke, and lime burners	6			6						2		2	3	1	
Engineers and firemen (not locomotive)	126	4	4	118	10	2	8	20	7	10	8	45	56	15	2
Glovemakers	18			18	2	1	3	6	1		1	8	6	4	
Manufacturers and officials, etc	248	15	9	224	2	5	20	27	27	15	22	91	83	39	11
Model and pattern makers	27	1	2	24	3	2	5	10	1		1	12	6	4	2
Photographers	55			55	4	8	11	23	7	2	3	35	18	2	
Rubber factory operatives	12	1		11	3	1	3	7	1			8	3		
Tobacco and cigar factory operatives	233	3	11	219	39	30	46	115	39	27	9	190	21	5	3
Upholsterers	56	1	1	54	5	6	13	24	7	6	2	39	10	5	
Other miscellaneous industries	223	1	9	213	33	29	46	108	25	14	7	154	39	12	7

TABLE LXXIII.—THE DEAF ENGAGED IN EACH OCCUPATION AND CLASS OF OCCUPATIONS, BY DEGREE OF DEAFNESS, ABILITY TO SPEAK, SEX, RACE, AND PRESENT AGE.

OCCUPATION.	Aggregate.	DEGREE OF DEAFNESS.		ABILITY TO SPEAK.			SEX.		RACE.		PRESENT AGE.		
		Totally deaf.	Partially deaf.	Well.	Imperfectly.	Not at all.	Male.	Female.	White.	Colored.	10 and under 20.	20 and over.	Unknown.
All occupations	32,142	12,678	19,464	21,274	2,722	8,146	26,637	5,505	29,831	2,311	1,668	30,353	121
Agricultural pursuits	14,068	4,761	9,307	9,807	1,113	3,148	13,126	942	12,827	1,241	887	13,139	42
Agricultural laborers	2,016	1,218	798	722	309	985	1,813	203	1,516	500	444	1,564	8
Dairymen and dairywomen	29	7	22	27	1	1	22	7	29	.....	.....	29	.....
Farmers, planters, and overseers	11,428	3,366	8,062	8,597	764	2,067	10,721	707	10,742	686	423	10,974	31
Gardeners, florists, nurserymen, etc	330	75	255	277	15	38	314	16	316	14	5	324	1
Lumbermen and raftsmen	51	31	20	32	2	17	51	.....	48	3	1	50	.....
Stock raisers, herders, and drovers	147	41	106	110	14	23	138	9	130	17	10	136	1
Turpentine farmers and laborers	4	1	3	3	.....	1	4	.....	2	2	.....	4	.....
Wood choppers	52	18	34	30	7	15	52	.....	33	19	4	47	1
Other agricultural pursuits	11	4	7	9	1	1	11	.....	11	.....	.....	11	.....
Professional service	1,080	387	693	869	68	143	832	248	1,058	22	13	1,058	9
Actors, professional showmen, etc	23	16	7	14	3	6	23	.....	21	2	2	21	.....
Architects, designers, draftsmen, etc	46	15	31	41	1	4	45	1	46	.....	1	45	.....
Artists and teachers of art	114	60	54	68	14	32	51	63	113	1	3	110	1
Clergymen	116	18	98	112	3	1	112	4	108	8	.....	114	2
Dentists	20	3	17	19	.....	1	20	.....	20	.....	.....	20	.....
Electricians	18	4	14	16	1	1	18	.....	18	.....	1	17	.....
Engineers (civil, etc.) and surveyors	43	5	38	43	.....	.....	43	.....	43	.....	.....	42	1
Journalists	54	17	37	51	3	.....	47	7	54	.....	.....	54	.....
Lawyers	90	7	83	87	2	1	89	1	88	2	.....	90	.....
Literary and scientific persons	40	11	29	38	2	.....	24	16	40	.....	1	39	.....
Musicians and teachers of music	39	2	37	38	1	.....	12	27	39	.....	3	36	.....
Officials (government)	62	11	51	56	.....	6	55	7	62	.....	.....	62	.....
Physicians and surgeons	106	10	96	105	1	.....	101	5	104	2	.....	105	1
Teachers and professors in colleges, etc	294	206	88	166	37	91	177	117	287	7	2	288	4
Other professional service	15	2	13	15	.....	.....	15	.....	15	.....	.....	15	.....
Domestic and personal service	5,316	2,395	2,921	3,130	527	1,659	3,210	2,106	4,548	768	280	4,995	41
Barbers and hairdressers	122	74	48	55	15	52	117	5	110	12	4	118	.....
Bartenders	9	3	6	7	.....	2	9	.....	9	.....	.....	9	.....
Boarding and lodging house keepers	125	13	112	118	3	4	17	108	121	4	.....	125	.....
Hotel keepers	96	18	78	90	.....	6	74	22	95	1	1	94	1
Housekeepers and stewards	230	91	139	158	15	57	10	220	223	7	9	220	1
Janitors and sextons	74	15	59	66	1	7	66	8	71	3	.....	74	.....

Barbers and hairdressers	122	74	48	55	15	52	117	5	110	12	4	118	.....
Bartenders	9	3	6	7	.....	2	9	.....	9	.....	.....	9	.....
Boarding and lodging house keepers	125	13	112	118	3	4	17	108	121	4	.....	125	.....
Hotel keepers	96	18	78	90	.....	6	74	22	95	1	1	94	1
Housekeepers and stewards	230	91	139	158	15	57	10	220	223	7	9	220	1
Janitors and sextons	74	15	59	66	1	7	66	8	71	3	.....	74	.....
Laborers (not specified)	2,718	1,217	1,501	1,573	264	881	2,587	131	2,424	294	144	2,560	14
Launderers and laundresses	452	210	242	280	40	132	38	414	287	165	12	435	5
Nurses and midwives	57	9	48	48	4	5	6	51	48	9	.....	57	.....
Restaurant keepers	21	6	15	15	5	1	20	1	19	2	.....	21	.....
Saloon keepers	26	4	22	24	1	1	26	.....	26	.....	.....	26	.....
Servants and waiters	1,303	712	591	634	172	497	150	1,144	1,040	263	106	1,177	20
Soldiers, sailors, and marines (U. S.)	3	.....	3	3	.....	.....	3	.....	3	.....	.....	3	.....
Watchmen, policemen, firemen, etc	48	6	42	41	3	4	48	.....	48	.....	.....	48	.....
Other domestic and personal service	32	17	15	18	4	10	30	2	24	8	4	28	.....
Trade and transportation	2,236	552	1,684	1,866	97	273	2,046	190	2,171	65	77	2,152	7
Agents	231	61	170	197	5	29	200	31	229	2	2	229	.....
Bankers and brokers	119	18	101	111	3	5	86	33	119	.....	.....	119	.....
Boatmen and sailors	45	8	37	40	1	4	45	.....	44	1	.....	45	.....
Bookkeepers and accountants	124	27	97	112	6	6	102	22	123	1	4	120	.....
Clerks and copyists	263	105	158	192	15	56	241	22	259	4	18	244	1
Commercial travelers	33	8	25	26	2	5	31	2	33	.....	.....	33	.....
Draymen, hackmen, teamsters, etc	206	56	150	161	15	30	205	1	188	18	13	190	3
Foremen and overseers	3	.....	3	3	.....	.....	2	1	3	.....	.....	3	.....
Hostlers	47	24	23	25	3	19	47	.....	39	8	4	43	.....
Hucksters and peddlers	66	24	42	48	4	14	59	7	66	.....	1	65	.....
Livery stable keepers	30	3	27	29	.....	1	29	1	30	.....	1	29	.....
Merchants and dealers (except wholesale)	710	115	595	641	23	46	666	44	702	8	11	697	2
Merchants and dealers (wholesale)	7	4	3	5	1	1	7	.....	7	.....	.....	7	.....
Messengers and errand and office boys	13	6	7	8	2	3	13	.....	12	1	7	6	.....
Officials of banks and companies	22	4	18	20	1	1	21	1	22	.....	.....	22	.....
Packers and shippers	26	17	9	13	4	9	22	4	26	.....	2	24	.....
Porters and helpers (in stores, etc.)	39	22	17	20	1	18	39	.....	24	15	1	38	.....
Salesmen and saleswomen	77	20	57	63	4	10	70	7	77	.....	3	73	1
Steam railroad employees	106	15	91	96	5	5	101	5	100	6	3	103	.....
Stenographers and typewriters	15	3	12	13	1	1	6	9	15	.....	1	14	.....
Street railway employees	1	.....	1	1	.....	.....	1	.....	1	.....	.....	1	.....
Telegraph and telephone linemen	3	1	2	2	.....	1	3	.....	3	.....	1	2	.....
Telegraph and telephone operators	16	.....	16	16	.....	.....	16	.....	16	.....	.....	16	.....
Undertakers	13	2	11	11	.....	2	13	.....	13	.....	.....	13	.....
Other persons in trade and transportation	21	9	12	13	1	7	21	.....	20	1	5	16	.....
Manufacturing and mechanical pursuits	9,442	4,583	4,859	5,602	917	2,923	7,423	2,019	9,227	215	411	9,009	22
Building trades	2,000	738	1,262	1,407	137	456	1,981	19	1,936	34	48	1,946	6
Carpenters and joiners	1,121	371	750	837	65	219	1,114	7	1,102	19	21	1,097	3
Masons (brick and stone)	203	52	151	161	11	31	203	.....	196	7	3	199	1
Painters, glaziers, and varnishers	399	223	176	213	34	152	392	7	395	4	14	383	2
Paper hangers	30	5	25	27	1	2	30	.....	28	2	.....	30	.....
Plasterers	59	17	42	47	3	9	58	1	58	1	2	57	.....
Plumbers and gas and steam fitters	20	4	16	15	2	3	20	.....	20	.....	2	18	.....
Roofers and slaters	7	.....	7	7	.....	.....	7	.....	7	.....	.....	7	.....
Mechanics (not otherwise specified)	161	66	95	100	21	40	157	4	160	1	6	155	.....
Chemicals and allied products	20	7	13	15	2	3	18	2	20	.....	.....	20	.....
Oil well and oil works employees	16	3	13	14	1	1	16	.....	16	.....	.....	16	.....
Other chemical workers	4	4	.....	1	1	2	2	2	4	.....	.....	4	.....
Clay, glass, and stone products	129	63	66	75	9	45	125	4	127	2	5	124	.....
Brick and tile makers, etc	26	13	13	14	1	11	25	1	25	1	4	22	.....
Glassworkers	24	11	13	13	1	10	22	2	24	.....	1	23	.....
Marble and stone cutters	70	33	37	42	7	21	69	1	69	1	.....	70	.....
Potters	9	6	3	6	.....	3	9	.....	9	.....	.....	9	.....
Fishing and mining	350	103	247	261	22	67	345	5	338	12	15	334	1
Fishermen and oystermen	85	22	63	62	5	18	84	1	81	4	1	83	1
Miners and quarrymen	265	81	184	199	17	49	261	4	257	8	14	251	.....
Food and kindred products	297	118	179	205	22	70	270	27	291	6	18	278	1
Bakers	103	61	42	50	10	43	90	13	102	1	7	96	.....
Butchers	91	23	68	76	3	12	90	1	90	1	8	82	1
Butter and cheese makers	6	2	4	5	.....	1	6	.....	6	.....	.....	6	.....
Confectioners	36	14	22	28	6	2	28	8	36	.....	3	33	.....
Millers	49	8	41	42	1	6	48	1	47	2	.....	49	.....
Other food preparers	12	10	2	4	2	6	8	4	10	2	.....	12	.....
Iron and steel and their products	869	316	553	618	61	190	860	9	851	18	17	850	2
Blacksmiths	348	84	264	293	17	38	347	1	334	14	8	339	1
Iron and steel workers	183	106	77	90	18	75	178	5	182	1	5	178	.....
Machinists	216	87	129	143	20	53	215	1	215	1	3	212	1
Steam boiler makers	54	3	51	52	1	1	54	.....	52	2	.....	54	.....
Stove, furnace, and grate makers	7	4	3	4	.....	3	7	.....	7	.....	.....	7	.....
Tool and cutlery makers	26	12	14	16	3	7	26	.....	26	.....	.....	26	.....
Wheelwrights	24	11	13	15	.....	9	24	.....	24	.....	.....	24	.....
Wireworkers	11	9	2	5	2	4	9	2	11	.....	1	10	.....
Leather and its finished products	955	646	309	364	118	473	914	41	933	22	46	907	2
Boot and shoe makers and repairers	794	559	235	276	98	420	756	38	773	21	41	751	2
Harness and saddle makers and repairers	110	59	51	59	13	38	109	1	109	1	2	108	.....
Leather curriers and tanners	41	22	19	23	6	12	39	2	41	.....	1	40	.....
Trunk and leather-case makers, etc	10	6	4	6	1	3	10	.....	10	.....	2	8	.....
Liquors and beverages	19	15	4	7	.....	12	18	1	18	1	2	17	.....
Bottlers and soda water makers, etc	13	10	3	5	.....	8	12	1	13	.....	2	11	.....
Brewers and maltsters	3	2	1	2	.....	1	3	.....	3	.....	.....	3	.....
Distillers and rectifiers	3	3	.....	.....	.....	3	3	.....	2	1	.....	3	.....
Lumber and its remanufactures	730	392	338	383	66	281	714	16	709	21	31	698	1
Cabinetmakers	180	119	61	71	18	91	180	.....	178	2	11	169	.....
Coopers	92	46	46	51	10	31	91	1	91	1	2	90	.....
Saw and planing mill employees	110	39	71	70	9	31	109	1	107	3	6	104	.....
Other woodworkers	348	188	160	191	29	128	334	14	333	15	12	335	1
Metals and metal products other than iron and steel	204	107	97	121	21	62	201	3	201	3	3	201	.....
Brassworkers	19	12	7	10	3	6	18	1	19	.....	.....	19	.....
Clock and watch makers and repairers	35	18	17	18	.....	17	35	.....	35	.....	.....	35	.....
Gold and silver workers	17	11	6	9	1	7	16	1	15	2	.....	17	.....
Tin plate and ware makers	65	33	32	45	9	11	64	1	65	.....	1	64	.....
Other metal workers	68	43	25	39	8	21	68	.....	67	1	2	66	.....

Other chemical workers	4	4		1	1	2	2	2	4			4	
Clay, glass, and stone products	129	63	66	75	9	45	125	4	127	2	5	124	
Brick and tile makers, etc	26	13	13	14	1	11	25	1	25	1	4	22	
Glassworkers	24	11	13	13	1	10	22	2	24		1	23	
Marble and stone cutters	70	33	37	42	7	21	69	1	69	1		70	
Potters	9	6	3	6		3	9		9			9	
Fishing and mining	350	103	247	261	22	67	345	5	338	12	15	334	1
Fishermen and oystermen	85	22	63	62	5	18	84	1	81	4	1	83	1
Miners and quarrymen	265	81	184	199	17	49	261	4	257	8	14	251	
Food and kindred products	297	118	179	205	22	70	270	27	291	6	18	278	1
Bakers	103	61	42	50	10	43	90	13	102	1	7	96	
Butchers	91	23	68	76	3	12	90	1	90	1	8	82	1
Butter and cheese makers	6	2	4	5		1	6		6			6	
Confectioners	36	14	22	28	6	2	28	8	36		3	33	
Millers	49	8	41	42	1	6	48	1	47	2		49	
Other food preparers	12	10	2	4	2	6	8	4	10	2		12	
Iron and steel and their products	869	316	553	618	61	190	860	9	851	18	17	850	2
Blacksmiths	348	84	264	293	17	38	347	1	334	14	8	339	1
Iron and steel workers	183	106	77	90	18	75	178	5	182	1	5	178	
Machinists	216	87	129	143	20	53	215	1	215	1	3	212	1
Steam boiler makers	54	3	51	52	1	1	54		52	2		54	
Stove, furnace, and grate makers	7	4	3	4		3	7		7			7	
Tool and cutlery makers	26	12	14	16	3	7	26		26			26	
Wheelwrights	24	11	13	15		9	24		24			24	
Wireworkers	11	9	2	5	2	4	9	2	11		1	10	
Leather and its finished products	955	646	309	364	118	473	914	41	933	22	46	907	2
Boot and shoe makers and repairers	794	559	235	276	98	420	756	38	773	21	41	751	2
Harness and saddle makers and repairers	110	59	51	59	13	38	109	1	109	1	2	108	
Leather curriers and tanners	41	22	19	23	6	12	39	2	41		1	40	
Trunk and leather-case makers, etc	10	6	4	6	1	3	10		10		2	8	
Liquors and beverages	19	15	4	7		12	18	1	18	1	2	17	
Bottlers and soda water makers, etc	13	10	3	5		8	12	1	13		2	11	
Brewers and maltsters	3	2	1	2		1	3		3			3	
Distillers and rectifiers	3	3				3	3		2	1		3	
Lumber and its remanufactures	730	392	338	383	66	281	714	16	709	21	31	698	1
Cabinetmakers	180	119	61	71	18	91	180		178	2	11	169	
Coopers	92	46	46	51	10	31	91	1	91	1	2	90	
Saw and planing mill employees	110	39	71	70	9	31	109	1	107	3	6	104	
Other woodworkers	348	188	160	191	29	128	334	14	333	15	12	335	1
Metals and metal products other													

Cabinetmakers	180	119	61	77	18	91	169	.....	176	2	11	166	.....
Coopers	92	46	46	51	10	31	91	1	91	1	2	90	.....
Saw and planing mill employees	110	39	71	70	9	31	109	1	107	3	6	104	.....
Other woodworkers	348	188	160	191	29	128	334	14	333	15	12	335	1
Metals and metal products other than iron and steel	204	107	97	121	21	62	201	3	201	3	3	201	.....
Brassworkers	19	12	7	10	3	6	18	1	19	.....	.....	19	.....
Clock and watch makers and repairers	35	18	17	18	.....	17	35	.....	35	.....	.....	35	.....
Gold and silver workers	17	11	6	9	1	7	16	1	15	2	.....	17	.....
Tin plate and tinware makers	65	23	42	45	9	11	64	1	65	.....	1	64	.....
Other metal workers	68	43	25	39	8	21	68	.....	67	1	2	66	.....
Paper and printing	606	480	126	202	95	309	547	59	604	2	49	553	4
Bookbinders	54	42	12	18	4	32	34	20	54	.....	3	51	.....
Boxmakers (paper)	18	14	4	6	2	10	12	6	18	.....	2	16	.....
Engravers	27	24	3	13	8	6	27	.....	27	.....	2	25	.....
Paper and pulp mill operatives	31	18	13	14	3	14	24	7	30	1	.....	30	1
Printers, lithographers, and pressmen	476	382	94	151	78	247	450	26	475	1	42	431	3
Textiles	2,214	1,101	1,113	1,296	260	658	505	1,709	2,150	64	127	2,084	3
Bleachery and dye works operatives	13	3	10	10	1	2	13	.....	13	.....	.....	13	.....
Carpet factory operatives	45	21	24	26	3	16	24	21	45	.....	1	44	.....
Cotton mill operatives	136	78	58	66	18	52	64	72	136	.....	13	123	.....
Hosiery and knitting mill operatives	31	21	10	14	6	11	8	23	31	.....	4	27	.....
Silk mill operatives	15	9	6	7	2	6	4	11	15	.....	2	13	.....
Woolen mill operatives	86	35	51	61	6	19	54	32	86	.....	3	82	1
Other textile mill operatives	24	11	13	15	2	7	15	9	20	4	2	22	.....
Dressmakers	706	314	392	466	74	166	2	704	690	16	29	677	.....
Hat and cap makers	26	14	12	14	2	10	16	10	26	.....	.....	26	.....
Milliners	53	16	37	38	7	8	2	51	53	.....	5	48	.....
Seamstresses	604	306	298	347	78	179	1	603	565	39	41	563	.....
Shirt, collar, and cuff makers	34	24	10	13	3	18	8	26	34	.....	3	31	.....
Tailors and tailoresses	402	236	166	190	53	159	283	119	400	2	21	379	2
Other textile workers	39	13	26	29	5	5	11	28	36	3	3	36	.....
Miscellaneous industries	1,049	497	552	648	104	297	925	124	1,019	30	50	997	2
Broom and brush makers	45	29	16	25	5	15	43	2	41	4	4	41	.....
Charcoal, coke, and lime burners	6	1	5	6	.....	.....	6	.....	4	2	.....	6	.....
Engineers and firemen (not locomotive)	126	29	97	108	4	14	126	.....	120	6	4	121	1
Glovemakers	18	9	9	11	2	5	8	10	18	.....	2	16	.....
Manufacturers and officials, etc	248	55	193	208	19	21	243	5	248	.....	.....	248	.....
Model and pattern makers	27	10	17	19	3	5	27	.....	27	.....	1	26	.....
Photographers	55	28	27	35	6	14	47	8	55	.....	.....	55	.....
Rubber factory operatives	12	10	2	5	2	5	9	3	12	.....	1	11	.....
Tobacco and cigar factory operatives	233	162	71	93	36	104	205	28	225	8	17	215	1
Upholsterers	56	31	25	31	5	20	55	1	56	.....	1	55	.....
Other miscellaneous industries	223	133	90	107	22	94	156	67	213	10	20	203	.....

TABLE LXXIV.—THE DEAF ENGAGED IN EACH OCCUPATION AND CLASS OF OCCUPATIONS, BY SCHOOL ATTENDANCE AND KIND OF SCHOOL ATTENDED.

OCCUPATION.	Total.	SCHOOL ATTENDANCE.			KIND OF SCHOOL ATTENDED.			
		Attended school.	Did not attend. school.	Not stated.	Special.	Other.	Both.	Not stated.
All occupations	32,142	26,030	3,950	2,162	8,163	8,821	125	8,921
Agricultural pursuits	14,068	10,668	2,294	1,106	2,578	4,016	23	4,051
Agricultural laborers	2,016	1,270	630	116	569	493	6	202
Dairymen and dairywomen	29	23	1	5	2	8	.....	13
Farmers, planters, and overseers	11,428	8,897	1,598	933	1,908	3,324	15	3,649
Gardeners, florists, nurserymen, etc	330	268	32	30	46	102	.....	120
Lumbermen and raftsmen	51	47	1	3	22	12	.....	13
Stock raisers, herders, and drovers	147	120	15	12	22	59	1	38
Turpentine farmers and laborers	4	3	1	.....	.....	1	.....	2
Wood choppers	52	30	16	6	8	13	.....	9
Other agricultural pursuits	11	10	.....	1	1	4	.....	5
Professional service	1,080	1,037	16	27	315	349	26	347
Actors, professional showmen, etc	23	22	1	.....	10	5	1	6
Architects, designers, draftsmen, etc	46	44	1	1	8	20	4	12
Artists and teachers of art	114	111	1	2	56	36	1	18
Clergymen	116	105	4	7	8	44	1	52
Dentists	20	20	.....	.....	2	9	.....	9
Electricians	18	17	1	.....	4	7	.....	6
Engineers (civil, etc.) and surveyors	43	40	.....	3	2	15	2	21
Journalists	54	51	2	1	7	25	2	17
Lawyers	90	87	2	1	2	32	1	52
Literary and scientific persons	40	40	.....	.....	2	21	2	15
Musicians and teachers of music	39	36	2	1	1	25	.....	10
Officials (government)	62	59	1	2	6	23	.....	30
Physicians and surgeons	106	99	.....	7	3	36	.....	60
Teachers and professors in colleges, etc	294	293	1	.....	204	46	12	31
Other professional service	15	13	.....	2	.....	5	.....	8
Domestic and personal service	5,316	3,903	988	425	1,369	1,328	12	1,194
Barbers and hairdressers	122	110	7	5	64	24	.....	22
Bartenders	9	9	.....	.....	2	5	.....	2
Boarding and lodging house keepers	125	100	11	14	9	36	.....	55
Hotel keepers	96	73	10	13	6	31	.....	36

Domestic and personal service	5,316	3,903	988	425	1,369	1,328	12	1,194
Barbers and hairdressers	122	110	7	5	64	24	.....	22
Bartenders	9	9	.....	.....	2	5	.....	2
Boarding and lodging house keepers	125	100	11	14	9	36	.....	55
Hotel keepers	96	73	10	13	6	31	.....	36
Housekeepers and stewards	230	181	28	21	57	63	1	60
Janitors and sextons	74	63	8	3	8	20	.....	35
Laborers (not specified)	2,718	2,015	483	220	741	651	5	618
Launderers and laundresses	452	299	112	41	88	103	1	107
Nurses and midwives	57	43	8	6	6	19	.....	18
Restaurant keepers	21	16	3	2	2	7	.....	7
Saloon keepers	26	20	2	4	1	6	.....	13
Servants and waiters	1,303	909	309	85	368	342	5	194
Soldiers, sailors, and marines (U. S.)	3	3	.....	.....	.....	2	.....	1
Watchmen, policemen, firemen, etc	48	37	3	8	5	10	.....	22
Other domestic and personal service	32	25	4	3	12	9	.....	4
Trade and transportation	2,236	1,979	119	138	349	727	15	888
Agents	231	212	8	11	33	73	3	103
Bankers and brokers	119	103	3	13	6	34	.....	63
Boatmen and sailors	45	33	6	6	4	10	.....	19
Bookkeepers and accountants	124	119	1	4	18	54	1	46
Clerks and copyists	263	251	8	4	84	84	3	80
Commercial travelers	33	32	1	.....	7	11	.....	14
Draymen, hackmen, teamsters, etc	206	165	21	20	34	63	1	67
Foremen and overseers	3	2	.....	1	.....	2	.....	.....
Hostlers	47	28	16	3	7	16	.....	5
Hucksters and peddlers	66	55	4	7	15	17	.....	23
Livery stable keepers	30	26	3	1	3	12	.....	11
Merchants and dealers (except wholesale)	710	643	22	45	70	232	5	336
Merchants and dealers (wholesale)	7	7	.....	.....	2	3	.....	2
Messengers and errand and office boys	13	9	2	2	2	4	.....	3
Officials of banks and companies	22	19	.....	3	1	6	1	11
Packers and shippers	26	23	2	1	12	7	.....	4
Porters and helpers (in stores, etc.)	39	28	8	3	14	11	.....	3
Salesmen and saleswomen	77	69	1	7	16	21	1	31
Steam railroad employees	106	87	12	7	7	37	.....	43
Stenographers and typewriters	15	15	.....	.....	3	5	.....	7
Street railway employees	1	1	.....	.....	.....	.....	.....	1
Telegraph and telephone linemen	3	3	.....	.....	.....	2	.....	1
Telegraph and telephone operators	16	15	1	.....	.....	10	.....	5
Undertakers	13	13	.....	.....	3	4	.....	6
Other persons in trade and transportation	21	21	.....	.....	8	9	.....	4
Manufacturing and mechanical pursuits	9,442	8,443	533	466	3,552	2,401	49	2,441
Building trades	2,000	1,778	102	120	539	545	8	686
Carpenters and joiners	1,121	985	59	77	258	282	4	441
Masons (brick and stone)	203	170	17	16	26	69	1	74
Painters, glaziers, and varnishers	399	377	7	15	183	107	3	84
Paper hangers	30	25	3	2	3	12	.....	10
Plasterers	59	45	9	5	7	14	.....	24
Plumbers and gas and steam fitters	20	20	.....	.....	5	10	.....	5
Roofers and slaters	7	6	.....	1	.....	2	.....	4
Mechanics (not otherwise specified)	161	150	7	4	57	49	.....	44
Chemicals and allied products	20	19	.....	1	7	6	.....	6
Oil well and oil works employees	16	15	.....	1	3	6	.....	6
Other chemical workers	4	4	.....	.....	4	.....	.....	.....
Clay, glass, and stone products	129	118	5	6	50	36	.....	32
Brick and tile makers, etc	26	24	1	1	9	9	.....	6
Glassworkers	24	24	.....	.....	12	6	.....	6
Marble and stone cutters	70	62	4	4	24	19	.....	19
Potters	9	8	.....	1	5	2	.....	1
Fishing and mining	350	279	42	29	52	117	.....	110
Fishermen and oystermen	85	67	15	3	4	31	.....	32
Miners and quarrymen	265	212	27	26	48	86	.....	78
Food and kindred products	297	263	18	16	84	99	.....	80
Bakers	103	96	4	3	49	25	.....	22
Butchers	91	80	6	5	14	40	.....	26
Butter and cheese makers	6	6	.....	.....	2	1	.....	3
Confectioners	36	32	2	2	7	13	.....	12
Millers	49	39	5	5	7	15	.....	17
Other food preparers	12	10	1	1	5	5	.....	.....
Iron and steel and their products	869	763	48	58	228	241	5	289
Blacksmiths	348	295	30	23	35	117	1	142
Iron and steel workers	183	162	9	12	84	38	2	38
Machinists	216	196	4	16	74	56	1	65
Steam boiler makers	54	47	2	5	4	17	.....	26
Stove, furnace, and grate makers	7	7	.....	.....	4	2	.....	1
Tool and cutlery makers	26	24	1	1	10	6	.....	8
Wheelwrights	24	22	2	.....	9	3	1	9
Wireworkers	11	10	.....	1	8	2	.....	.....
Leather and its finished products	955	868	46	41	569	142	3	154
Boot and shoe makers and repairers	794	724	36	34	505	111	3	105
Harness and saddle makers and repairers	110	97	8	5	43	18	.....	36
Leather curriers and tanners	41	38	1	2	15	12	.....	11
Trunk and leather-case makers, etc	10	9	1	.....	6	1	.....	2
Liquors and beverages	19	16	2	1	11	2	.....	3
Bottlers and soda water makers, etc	13	12	1	.....	7	2	.....	3
Brewers and maltsters	3	2	.....	1	2	.....	.....	.....
Distillers and rectifiers	3	2	1	.....	2	.....	.....	.....
Lumber and its remanufactures	730	666	37	27	338	152	5	171
Cabinetmakers	180	175	3	2	118	27	1	29
Coopers	92	79	7	6	34	20	.....	25
Saw and planing mill employees	110	97	8	5	28	38	1	30
Other woodworkers	348	315	19	14	158	67	3	87
Metals and metal products other than iron and steel	204	187	11	6	88	43	2	54
Brassworkers	19	18	1	.....	12	4	.....	2
Clock and watch makers and repairers	35	35	.....	.....	17	6	.....	12
Gold and silver workers	17	15	2	.....	10	4	.....	1
Tin, slate, and zinc workers	.....	.....	.....	.....	.....	.....	.....	.....

Brick and tile makers, etc	26	24	1	1	9	9	.....	6
Glassworkers	24	24	.....	.....	12	6	.....	6
Marble and stone cutters	70	62	4	4	24	19	.....	19
Potters	9	8	.....	1	5	2	.....	1
Fishing and mining	350	279	42	29	52	117	.....	110
Fishermen and oystermen	85	67	15	3	4	31	.....	32
Miners and quarrymen	265	212	27	26	48	86	.....	78
Food and kindred products	297	263	18	16	84	99	.....	80
Bakers	103	96	4	3	49	25	.....	22
Butchers	91	80	6	5	14	40	.....	26
Butter and cheese makers	6	6	.....	.....	2	1	.....	3
Confectioners	36	32	2	2	7	13	.....	12
Millers	49	39	5	5	7	15	.....	17
Other food preparers	12	10	1	1	5	5	.....	.....
Iron and steel and their products	869	763	48	58	228	241	5	289
Blacksmiths	348	295	30	23	35	117	1	142
Iron and steel workers	183	162	9	12	84	38	2	38
Machinists	216	196	4	16	74	56	1	65
Steam boiler makers	54	47	2	5	4	17	.....	26
Stove, furnace, and grate makers	7	7	.....	.....	4	2	.....	1
Tool and cutlery makers	26	24	1	1	10	6	.....	8
Wheelwrights	24	22	2	.....	9	3	1	9
Wireworkers	11	10	.....	1	8	2	.....	.....
Leather and its finished products	955	868	46	41	569	142	3	154
Boot and shoe makers and repairers	794	724	36	34	505	111	3	105
Harness and saddle makers and repairers	110	97	8	5	43	18	.....	36
Leather curriers and tanners	41	38	1	2	15	12	.....	11
Trunk and leather-case makers, etc	10	9	1	.....	6	1	.....	2
Liquors and beverages	19	16	2	1	11	2	.....	3
Bottlers and soda water makers, etc	13	12	1	.....	7	2	.....	3
Brewers and maltsters	3	2	.....	1	2	.....	.....	.....
Distillers and rectifiers	3	2	1	.....	2	.....	.....	.....
Lumber and its remanufactures	730	666	37	27	338	152	5	171
Cabinetmakers	180	175	3	2	118	27	1	29
Coopers	92	79	7	6	34	20	.....	25
Saw and planing mill employees	110	97	8	5	28	38	1	30
Other woodworkers	348	315	19	14	158	67	3	87

Cabinetmakers	180	175	3	2	118	27	1	29
Coopers	92	79	7	6	34	20	.....	25
Saw and planing mill employees	110	97	8	5	28	38	1	30
Other woodworkers	348	315	19	14	158	67	3	87
Metals and metal products other than iron and steel	204	187	11	6	88	43	2	54
Brassworkers	19	18	1	.....	12	4	.....	2
Clock and watch makers and repairers	35	35	.....	.....	17	5	.....	13
Gold and silver workers	17	15	2	.....	10	4	.....	1
Tin plate and tinware makers	65	59	4	2	15	23	.....	21
Other metal workers	68	60	4	4	34	7	2	17
Paper and printing	606	591	6	9	443	81	9	58
Bookbinders	54	51	1	2	38	9	.....	4
Boxmakers (paper)	18	18	.....	.....	10	4	.....	4
Engravers	27	27	.....	.....	21	2	1	3
Paper and pulp mill operatives	31	25	4	2	13	7	.....	5
Printers, lithographers, and pressmen	476	470	1	5	361	59	8	42
Textiles	2,214	1,950	161	103	781	642	13	514
Bleachery and dye works operatives	13	11	1	1	3	5	.....	3
Carpet factory operatives	45	36	7	2	14	11	1	10
Cotton mill operatives	136	110	19	7	53	25	.....	32
Hosiery and knitting mill operatives	31	26	3	2	15	8	.....	3
Silk mill operatives	15	13	2	.....	6	5	.....	2
Woolen mill operatives	86	71	7	8	24	30	1	16
Other textile mill operatives	24	20	3	1	10	5	.....	5
Dressmakers	706	663	22	21	227	255	5	176
Hat and cap makers	26	23	3	.....	11	4	.....	8
Milliners	53	46	2	5	13	15	.....	18
Seamstresses	604	512	61	31	191	175	4	142
Shirt, collar, and cuff makers	34	30	2	2	21	6	.....	3
Tailors and tailoresses	402	358	24	20	188	86	2	82
Other textile workers	39	31	5	3	5	12	.....	14
Miscellaneous industries	1,049	945	55	49	362	295	4	284
Broom and brush makers	45	36	5	4	19	8	1	8
Charcoal, coke, and lime burners	6	5	1	.....	.....	3	.....	2
Engineers and firemen (not locomotive)	126	102	15	9	14	39	.....	49
Glovemakers	18	16	1	1	5	1	.....	10
Manufacturers and officials, etc	248	229	2	17	29	92	.....	108
Model and pattern makers	27	25	2	.....	8	10	.....	7
Photographers	55	54	.....	1	22	16	1	15
Rubber factory operatives	12	11	1	.....	8	2	.....	1
Tobacco and cigar factory operatives	233	215	10	8	122	59	1	33
Upholsterers	56	55	.....	1	26	13	.....	16
Other miscellaneous industries	223	197	18	8	109	52	1	35

THE PHYSIOLOGY OF THE BLIND.[1]

(The Vicariate of the Senses.)

BY M. KUNZ, ILLZACH-MÜLHAUSEN, GERMANY.

It is a widely spread opinion that the loss of one sense produces such a strengthening of the other organs of sense, that they are enabled to become substitutes, at least to a very large extent, for the missing sense, acting, so to speak, as vicariates.

It is an actual fact that people speak of a "vicariate of the senses." Thus the loss of sight is said to sharpen the sense of hearing, and especially the sense of touch, in an almost supernatural manner. In my youth I even read in a text-book that in olden times a blind man had been appointed court tailor of a king, because he made the most beautiful many-colored clothes for him, since he was able to distinguish even the finest shades of color by the touch.

I was then at an age when you believe everything you read. It therefore became an axiom for me that the blind can "feel" colors. In after life, during my activity in middle and higher schools for seeing pupils, I did not fail to make proselytes for my opinion whenever light and heat were spoken of in the instruction in physics, and simply endeavored to seek a plausible explanation of this strange "fact."

I finally thought that I had found such an explanation in the varying degrees of heat possessed by different colored materials. I could not fully understand that colors as such could be distinguished by the sense of touch, because I reasoned this way, that if that were true, it would also be possible to distinguish odors by the touch, to see or feel sounds, and distinguish tastes by the skin. But of the "fact" I had no doubt. Nor did I consider myself alone in this view. At any rate, some eighteen years ago a prominent educator maintained in my presence that he had known a blind person who could distinguish colors with her hand. When, meanwhile, I had for several years been a teacher in an institution for the blind, and had become a heretic, I vainly endeavored to convert that gentleman to my new opinion, by telling him that the blind person in question must still have received some impressions of light, that consequently she could distinguish colors by the eye, or tell different colored wool

[1] Translated for the Association Review, with the permission of the author, and reprinted in pamphlet form by the Volta Bureau, Washington.

from other indications, *e. g.*, position, size, or consistence of the balls, the texture of the material, etc. I even explained to him the method followed in our institution where totally blind girls work with materials of many different colors (wool, cotton, bristles, etc.). All in vain! He stuck to his opinion, and seemed as if he would have liked to say to me: "Your pupils have remained very backward."

When we consider how in many institutions for the blind—especially those in Romanic and Slavic countries—people fairly revel in colors, so as to heighten the admiration of the public, we cannot be astonished if such views become firmly rooted. Thus I have never seen such an orgy of colors as last year in the female work of the Naples institution for the blind (Congress of teachers of the blind at Milan). I am sorry to state that no strong opposition is raised to such entirely erroneous ideas which only too often are expressed by visitors of institutions for the blind. We meet with so many fatal prejudices which prove an injury to the blind, that we often hesitate to crush those errors, be they ever so ridiculous, which strengthen the belief in the capability of the blind, and might therefore prove useful to them.

How often do we hear people, who tell us the most incredible and impossible things of the delicate feeling of the blind, ask the questions: "But can they find their own bed, their own washbowl, etc.? Can they dress themselves, eat without aid? Do they find their mouth? Can they speak?" etc., etc.

Who will be astonished if some wag of a teacher of the blind not only does not root out these erroneous ideas in such people, which they foster with tender care, but even tells them some more fairy tales? Of course, this is not a nice thing to do, but it is easily explained. There are evidently some blind who endeavor to make themselves important by exaggerations and deceptions.

When twenty years ago I exchanged the directorship of a school for seeing pupils for that of an institution for the blind, I likewise harbored amongst the rest the fairy tale of the ability of the blind "to feel colors," but was soon cured by the blind themselves.

I had also often read and heard that the blind were able to distinguish the most infinitessimal unevenness in a body, which would entirely escape the touch of a seeing person. I consequently expected unreasonable things from the sense of touch of my pupils.

When the General Congress of teachers of the blind of Frankfurt-on-the-Main (1882), referring to my report on instruction in geography, requested me to prepare maps for the blind on the prin-

ciples laid down by me, and when numberless attempts at last let me reach my object, I was not a little proud to print very sharply defined embossed or raised lines of rivers, cities, and boundaries. I examined the maps with closed eyes, and was able to follow every line with the points of my fingers, which had become hard by the continuous labor of engraving in hard wood. But when I tried to use these maps in the instruction of a class of large, intelligent girls—one of whom has been for years a teacher in a foreign country—the sense of touch failed. They did not find their way on the map. At first I thought it was obstinacy, and became impatient. Then, to please me, they deceived me, and in order to satisfy me, they pretended to have made observations which they had not made and could not have made. I found out their game, and immediately turned the geographical instruction over to a teacher whose views were not clouded by a morbid affection for "his children," and to whom the pupils, without fear of hurting his feelings, told the truth; so that I likewise learned it.

At that time the maps had been sent for examination to nearly all European institutions for the blind.

Very nearly the same replies were received from all: "Beautiful, but too fine;" "splendid, but not accessible to the touch," etc. "K. has shown himself a master of geographical representation, even if . . . ." Thus spoke the presiding officer of the geographical commission at the Amsterdam Congress. In every case there was a "but" or "if." The European colleagues were not satisfied, until I furnished maps which—besides correct representation of the mountain ranges—showed lines of rivers and rows of points, which any one could feel even with leather gloves, and which would guide even fingers with a very hard touch, like the rails guide the wheel of the car. Only after this object had been reached, the atlas, now comprising 83 maps, found universal favor and was introduced in the institutions for the blind of most civilized nations of the world (so far about 100,000 sheets have been ordered, 30,000 by the German-Austro-Danish Association for promoting the education of the blind).

In this case also I had to lower my expectation very considerably regarding the sense of touch, if I was to make myself useful to the great mass of the blind. I had the same experience with the zoological and botanical representations, and especially with those used for instruction in physics. Entirely new forms had to be prepared repeatedly, before the required accessibility to touch was reached. Today, after an experience of twenty years, I expect much

less from the sense of touch, but very much more from the power of resistance of the paper.

A fully tested measure for the sense of touch—the power of the blind to localize, or their sense of space—has been furnished by the Braille pointed type, called so after their blind inventor, Louis Braille.

Not more than twenty or twenty-two years ago the raised Latin capital types (A, B, C, D, etc.) were universally used in Germany; and in this type the German Bible was printed here, 1859-1863. The blind could decipher this type and read it slowly in their youth, but only with great difficulty later in life, unless they knew the greater part of the contents by heart; this type was really intended more for the seeing teacher than for the blind. In the course of the last twenty years this type has, in spite of the most violent objections of many teachers of the blind, been completely ousted from the printing offices, and been replaced by the pointed type.

The basis of this last-mentioned type is formed by two perpendicular rows of 3 points, each (⠃ the French é).

These conical points ⠁⠁ were, twenty years ago, 3 millimeters distant from each other—measured from point to point. (Measured at the base 4 millimeters.) These measurements, suitable for the fingers of the blind, had been found in a purely empirical way. To save space, these measurements were reduced to 2½ and 3½ millimeters, respectively, in France even to 2¼, and 3 millimeters at the base. But it soon became apparent that, as far as the majority of the blind was concerned, the limits of the sense of touch, and of legibility, had been exceeded. Our blind find great difficulty in reading the editions of the French classics printed in this type. Consequently, Germany, Austria, etc., have returned to the old measurement of 3 millimeters at the points (obtuse points or cones). For simultaneous apprehension the "bridges" or "distances" measuring less than 3 millimeters were too short. Motions of touch consuming time—successive apprehension of the points—were required which made rapid reading impossible. For the *simultaneous* apprehension of several obtuse points by the blind, the "distance"[1] between the points should be 3 millimeters.

[1] In the following the term *"distance"* has been used for short, to indicate the distance at which two raised points of the type for the blind can be felt by the finger as *two*, and not as *one*.

That is the result of many years' experience at the institutions for the blind. Measurements by the compasses, in order to find the uttermost limit, *i. e.*, the shortest distance at which two points can be apprehended by the touch as two points and not as a single one, had been taken with but very few blind, or one individual only, by Weber, Czermak, Goltz, Gärttner, Goldschneider, Uhthoff, Hocheisen, and recently by Dr. Th. Heller.

American physiologists have also examined the sensorium of two deaf-blind, Laura Bridgman and Helen Keller.

In these last mentioned cases experiments were made with only one person. Furthermore, all these measurements have been taken with very primitive instruments, ordinary compasses, which could not furnish any data *concerning the strength of the pressure which after all has a decided influence on the result* (since the number of erroneous observations increases with the increased pressure.—Griesbach.) And yet, general conclusions have been drawn from this limited and partly unreliable material!

Whilst all the older investigators still speak of the great superiority of the sense of touch of the blind over that of seeing persons, Uhthoff admits, in a somewhat timid way, that in *one* person whom he had examined, and Heller, that in several persons examined by him (he principally speaks of two), without publishing exact results, there is "a not very perceptible sharpening of the sense of touch." He adds—and we quote his own words: "As the experiments made by means of compasses are as unsatisfactory as the former experiments regarding the sense of space, I refrain from publishing the data obtained." We, therefore, do not learn on what his timid assertion regarding the "not very great superiority" of the blind is based. In Helen Keller, likewise, nothing important in this respect was discovered.

So far, therefore, no definitive results have been obtained, nor could be obtained, because the measurements were limited to *too small* a number of persons, and *had been taken with unsuitable instruments.*

I was, therefore, exceedingly pleased when three years ago Prof. Dr. Griesbach, President of the German Association for school-hygiene, requested to be permitted to take a series of measurements on the pupils of our institution, with the view to institute a comparison between the strength of the sense of touch in blind and seeing persons of the same age.

When in a slightly doubting manner he spoke of the "vicariate

of the senses," and the alleged superiority of the senses of touch, hearing, and smell in the blind over those of seeing persons, I told him plainly that, after my experience, I had no faith in these assertions, and that most blind would hardly distinguish the two points of his æsthesiometer at distances of less than 2 millimeters, as two separate sensations, by the point of the reading finger.

Prof. Dr. Griesbach, therefore, entered upon his investigation without a firm faith in the old dogma of the vicariate of the senses, but also without the intention to destroy it. I placed all our pupils at his disposal, and let him select the persons on whom experiments were to be made, so as to avoid all suspicion of my influencing the result by selecting pupils with a specially fine sense of touch or pupils who were not very bright. As he did not know any of them, he actually selected pupils of greatly varying capability, mostly those who had not yet begun to receive instruction in a trade, but who, outside of the common instruction received instruction only in some manual labor, or in music.

By means of his new æsthesiometer—with parallel pins on springs—he examined the spaces (the smallest distances at which impressions of two points can be felt as two sensations) on the forehead, the cheek bone, the point of the nose, the lips, the thick part of the thumb, and the points of the forefingers of both hands.

By means of Zwaardemaker's olfactometer observations regarding the sense of smell were taken in the long rope-walk, in the corridor of the female department, about 40 meters long, regarding the distance at which sounds can be distinguished, and in our garden, by means of the angular mirror (Winkelspiegel), regarding the localization of the direction of the sound.

For the sake of comparison, pupils of the public schools of Mülhausen of the same age were examined in exactly the same manner as the blind. The results of thousands of observations were entered in eighty-nine tables, in such a manner as to place the blind side by side with the seeing.

I. Distinguishing the Direction of the Sound.

At the celebration of the jubilee of the institution for the blind at Lausanne, the well-known oculist, Prof. Dr. Marc Dufour, made the statement that, according to his observations, blind persons were better able than seeing ones to indicate the direction of the sound, and in connection therewith asked the question whether it would not

be advisable to appoint blind persons on vessels, for accurately determining in foggy weather the direction of signals made by other vessels or the location of landing places, as they could do this more accurately than seeing persons. Without furnishing any data relative to the method of observation employed by him, he states that the 19 blind examined by him, in indicating the direction of the sound made only 6 per cent of mistakes, whilst the seeing ones made 13 per cent.

He did not inform us under what conditions these observations had been made, and what had been the number of observations leading to the above result. Griesbach has thoroughly examined 28 seeing and 28 blind persons. Nine experiments were made with each one of these 56 persons, three of each on one ear (whilst alternately the other was closed up with moistened cotton), and three each on both ears.

Three perfectly faultless observations were furnished:

(*a*) With the left ear: 1 seeing person, no blind.

(*b*) With the right ear: none.

(*c*) With both ears: 3 seeing persons, 1 blind.

The average error as regards the left ear was 16° 23″ in the blind and 17° 9″ in the seeing ones; difference in favor of the blind, 0° 46″.

As regards the right ear: Blind, 19° 53″; seeing persons, 17° 40″; difference in favor of seeing persons, 2° 13″.

As regards both ears: Blind, 11° 47″; seeing persons, 10° 7″; difference in favor of seeing persons, 1° 40″.

The average of all the observations shows for the 28 blind an average error of 15° 35″, and for the 28 seeing ones, 15°.

In 252 observations the blind have indicated the direction of the sound correctly 68 times and the seeing 82 times.

Better results were obtained, with the exception of two persons—one seeing and one blind—with both ears than with one ear.

Therefore, as regards distinguishing the direction of the sound, no essential difference could be shown between the seeing and the blind, though there was an infinitessimal difference in favor of seeing persons.

II. Distance at which Sounds can be Distinguished.

The very extensive Tables XVIII-LXXI, mostly extending over two pages each of Griesbach's work, furnish data regarding the dis-

tance at which sounds can be distinguished, the acuteness of the sense of smell, and the acuteness of the sense of touch, in seeing and blind.

The examination relative to the distance at which sounds can be distinguished by seeing and blind took place in long corridors. Numbers from 1 to 100 and words of one syllable were spoken in a sharp whispering tone of voice. In this manner 49 seeing and 19 blind were examined. Several blind had been *excluded* from the *examination* because their organs of hearing could not be considered as normal.

The blind who could hear best could distinguish words with one ear at a distance of 45 meters (1 meter = 39.37 inches), and with the other ear at 40 meters; but a seeing person showed almost the same results.

The average distance at which sounds could be distinguished was in 19 blind and 49 seeing, right and left ear, exactly 26 meters.

This proves that the sense of hearing has gained nothing by the loss of sight.

The *musical* ear has nothing to do with the distance at which sounds can be distinguished. Nevertheless, there are men hard of hearing who can hardly distinguish human speech, because they hear only the vowels but not the consonants, and who still accurately distinguish musical sounds, even if they sound fainter to them than to persons with a normal sense of hearing. But the faintest musical sound is still "louder" than a (mute) consonant. The cortical organ of the inner ear, which is the intermediary for distinguishing the degrees of sound, is entirely independent of the eye, as independent as is the piano of the spectacles of the player. But no experienced teacher of the blind, who has to instruct many musical blind, will maintain that the musical ear of the average blind is naturally superior to that of the average seeing person. Only more care is taken in institutions for the blind to develop any talent, by imparting instruction in music to all the pupils, and by not dispensing with this instruction until all attempts have failed.

III. The Acuteness of the Sense of Smell.

This was measured by means of Zwaardemaker's olfactometer, which is described in Griesbach's work.

A glass tube encloses a rubber tube, and this again a glass tube of the same length, with a handle (smelling tube). As long as the

rubber is covered by glass on the outside and inside, no smell can be noticed.

If you pull out the "smelling tube" one centimeter, an equal length of the rubber tube in the inside remains uncovered, and imparts to the air in smelling (at the handle of the tube) a peculiar smell. In proportion as the smelling tube must be pushed out more or less, until the smell is noticed, the organ of smell is more or less sensitive. It can consequently be defined according to the length of tube pulled out.

Both nostrils were examined.

In 20 blind the tube had, on an average, to be pulled out, for the left nostril 1.56 centimeters and for the right nostril 1.94 centimeters, before the smell of the rubber could be noticed. In 40 seeing persons 1.16 centimeters sufficed to bring about this result, and in 24 other seeing persons 1.14 centimeters.

As regards the blind, the average is therefore 1.75 centimeters; as regards the seeing persons, 1.15 centimeters. Difference in favor of the seeing, 6 millimeters.

IV. Acuteness of the Sense of Touch.

We now get to the main point, the sense of touch, to which, in the blind, the most incredible magic powers are ascribed. It probably has never been asserted that the blind could smell or hear colors, but very often that they could distinguish them by the touch. And still the one would not be more marvelous than the other.

The question was, therefore, to ascertain at different parts of the body at what minimum distance two simultaneous pricks of the pin can be distinguished as two different sensations, and not as one. As I said above, the observations were taken by means of Griesbach's new æsthesiometer (parallel pins or springs with nonius).

The observations extended to the forehead, the cheek-bone, the point of the nose, the lips, the thick part of the thumb, and the points of both forefingers. The observations were made partly on holidays, partly after school hours, partly after instruction in manual labor, and extended to 37 blind and 56 seeing.

First, 10 blind and 15 seeing were examined after mental work (instruction). The distances between two points at which they can be felt as two by the touch showed the following averages in millimeters:

I.

	Forehead.	Cheek-bone.	Point of the nose.	Lips.	Thick part of the thumb.	Left forefinger.	Right forefinger.
Blind	4.5	4.9	1.86	1.72	4.8	1.49	1.91
Seeing	4.2	4.4	1.55	1.36	4.1	1.36	1.38
Difference in favor of the seeing	0.3	0.5	0.31	0.36	0.7	0.13	0.53

The seeing, therefore, showed a finer sense of touch than the blind. As regards the forefinger of the right hand, which specially interests us, the difference is 0.53, therefore more than one-third of the total of the seeing.

The examination of 15 blind and 15 seeing on holidays showed the following results, in millimeters:

II.

	Forehead.	Cheek-bone.	Point of the nose.	Lips.	Thick part of the thumb.	Left forefinger.	Right forefinger.
Blind	3.6	3.7	1.7	1.5	3.77	1.29	1.55
Seeing	2.46	2.59	0.85	1.01	2.41	0.72	0.65
Difference in favor of the seeing	1.14	1.11	0.85	0.49	1.36	0.57	0.90

Here the difference is still more striking, as in the thick part of the thumb it amounts to almost 1½ millimeters, and at the forefinger of the right hand to 9/10 millimeters. *In order that the blind might, with the forefinger of the right hand, alleged to possess a particularly acute sense of touch, feel two points as two and not as one, the points had to be put at twice the distance (1.55 instead of .65) as for the seeing.*

The examination of 16 blind and 19 seeing after labor of several hours in the workshop (2 to 2½ hours for the blind) showed the following results (averages), in millimeters:

III.

	Forehead.	Cheek-bone.	Point of the nose.	Lips.	Thick part of the thumb.	Left fore-finger.	Right fore-finger.
Blind	5.97	5.84	2.275	2.0	6.0	1.7	2.0
Seeing	4.20	4.40	1.50	1.32	4.43	1.5	1.4
Difference in favor of the seeing	1.77	1.44	0.775	0.68	1.57	0.2	0.6

The same striking difference! Measurements as regards 15 blind and 13 seeing (excepting only one) in free time showed the following results, in millimeters:

IV.

	Forehead.	Cheek-bone.	Point of the nose.	Lips.	Thick part of the thumb.	Left fore-finger.	Right fore-finger.
Blind	3.2	3.2	1.5	1.4	3.15	1.2	1.37
Seeing	2.5	2.5	0.9	0.9	2.93	1.1	1.15
Difference in favor of the seeing	0.7	0.7	0.6	0.5	0.22	0.1	0.22

Also in this case the proportion does not change very much. Seven blind (ages 12-16 years) after manual labor—plaiting—and 7 seeing of the same age after *labor in workshops,* showed the following results, in millimeters:

V.

	Forehead.	Cheek-bone.	Point of the nose.	Lips.	Thick part of the thumb.	Left fore-finger.	Right fore-finger.
Blind.	5.5	6.1	2.20	1.8	5.6	1.51	1.77
Seeing	4.1	4.5	1.67	1.4	4.6	1.41	1.30
Difference in favor of the seeing	1.4	1.6	0.53	0.4	1.0	0.1	0.47

Likewise after mental work:

VI.

	Forehead.	Cheek-bone.	Point of the nose.	Lips.	Thick part of the thumb.	Left fore-finger.	Right fore-finger.
Blind	4.3	4.7	1.9	1.8	4.9	1.49	2.01
Seeing	4.3	4.6	1.71	1.47	4.2	1.3	1.3
Difference in favor of the seeing	.....	0.1	0.19	0.33	0.7	0.19	0.71

The examination of 2 blind girls and 2 seeing servant girls of the same age has (as regards the blind on holidays) shown the following results, in millimeters:

VII.

	Forehead.	Cheek-bone.	Point of the nose.	Lips.	Thick part of the thumb.	Left fore-finger.	Right fore-finger.
Blind	3.75	4.0	1.75	0.5	2.5	1.12	1.75
Seeing	2.75	3.25	1.25	1.35	3.5	0.8	0.8
Difference in favor of the seeing	1.0	0.75	0.50	0.15	1.0	0.32	0.95

Here the difference is still more striking, especially because the two blind girls had particularly fine, delicate fingers, and had, in addition to the usual instruction, been employed only in knitting and similar work, whilst one of the two seeing girls served as chamber-maid, and had evidently, when living in the country, worked in the fields. The spaces, as regards the right forefinger of the blind, are more than twice the size of those of the seeing! But entirely incomprehensible—from the point of view of the old dogma—were the results of an examination of two deaf-blind girls, one of whom, Magdalena Wenner, reads fluently, and finds her way on the map better than many pupils endowed with all their senses.

If nature really compensated with the one hand what it takes with the other, the three senses which these girls still possessed should have been extraordinarily strengthened; and still we find in them the most unfavorable results, i. e., not the least acuteness of the sense of smell (3.5 and 2.75), but also the largest spaces, viz:

M. W. (after instruction).....	7	7	4	3.5	1	2 5	3.5
" (on holiday).....	5	5	2	2	3.5	1.5	2
O. H. (after knitting, etc.).....	10	12	3.5	3	8	2.5	3

Where is, in this case, the vicariate for the two lost senses? I cannot find it.

M. W. owes her very considerable accomplishments not to a compensation by nature, *i. e.,* by nature strengthening the three remaining senses, and thus compensating for the loss of sight and hearing, for even the senses of smell and touch appear in her considerably weakened. Only in consequence of her extraordinary intelligence has the difficult labor of her educators borne rich fruit.

Tables LXXII and LXXXIX of Griesbach's work show the results of about 3,000 experiments made on seeing and blind, with the view to ascertain the frequency and direction of the so-called "erroneous observations." As these observations are only very slightly connected with the vicariate of the senses, I can pass them over, all the more as there does not seem to be any difference in this respect between the seeing and the blind. We therefore return to the tables showing the acuteness of the sense of touch.

They show everywhere greater distances between the points (Schwellenwerte), therefore a less acute sense of touch in the blind than in the seeing; and the difference is particularly striking in the right forefinger. Whilst the average difference in favor of the seeing is 0.24 millimeters for the left forefinger, it is 0.90 for the right.

If we now compare these figures with those of the blind, we find 1.66 millimeters for the left and 2.02 millimeters for the right forefinger.

On holidays these distances go down to 1.20 and 1.50 millimeters, respectively. *As a general rule the right forefinger of the blind finds its way less perfectly than the left, whilst there is no such difference in seeing persons.* Only in 4 of the 37 blind examined we find larger distances for the left than for the right; *they were persons who generally or exclusively read with the forefinger of the left hand.*

In 10 others the distances for the left and right forefinger are the same. Such blind *read with both forefingers,* letting the one immediately follow the other; or they have entered the institution late, have barely learned to read, and take no pleasure in it. With all the others, who *principally* read with the right hand (in copying all read with the left, and write with the right hand), the distances are *greater for the right than for the left hand.*

Unfortunately, not *all* the fingers were subjected to an examination. It is probably that for all non-reading fingers we would find shorter distances than for the forefingers.

The "reading-finger," the capabilities of which are so much admired by outsiders, has therefore in fact a *less* acute sense of touch than the finger which only plays the part of an assistant, and this finger is probably less sensitive than its idle colleagues. This shows that reading *blunts* the sense of touch, because the finger ends by the constant rubbing on the raised points become hard and *leathery,* because the epithelium becomes thick. The best readers who read almost as fast as seeing persons, show distances for the reading finger of 2, 2.6, and even 3 millimeters (Griesbach's Tables LV, LIX, LI, XXVIII).

They therefore appear as being hard of touch, considering that in the seeing who were examined and who do not read books printed for the blind, the average distance for the forefinger was only 1.1 millimeter. The blind in whom the distances approach those of seeing persons, *i. e.,* are less than 1.5 millimeters, read as a rule little and poorly (LVII, XL, VII, XLIV, etc.), or at least not as well as those who have a harder sense of touch. *It is not rough manual labor which spoils the sense of touch,* as has been maintained, for those who required the shortest distances, 0.5 and 0.8 millimeters (XLVII and LVII) were *basket makers.* Both of them read poorly, although they are very intelligent.

The question now arises: Why can seeing persons with an "acute sense of touch" not read books for the blind, or can only decipher them with difficulty, whilst the blind with a much less acute sense of touch read so fluently that you might think they were reciting?

The present type used for books for the blind (the Braille-type) consists, as has already been stated, of raised conical points, 2¼-3 millimeters distant from each other. (I have already stated that the distance between the points below 3 millimeters has been abandoned in Germany and Austria.)

The forms are as follows: ⠿ = é

⠁ ⠃ ⠉ ⠙ ⠑ ⠋ ⠛ ⠓ ⠊ ⠚

a b c d e f g h i j

For the second series of ten letters one point is added below in the first perpendicular row:

(*a* + ⠂ = *k*; *b* + ⠂ = *l*; *c* + ⠂ = *m*, etc.)

⠅ ⠇ ⠍ ⠝ ⠕ ⠏ ⠟ ⠗ ⠎ ⠞

k l m n o p q r s t

For the third series one point is added below in the second perpendicular line:

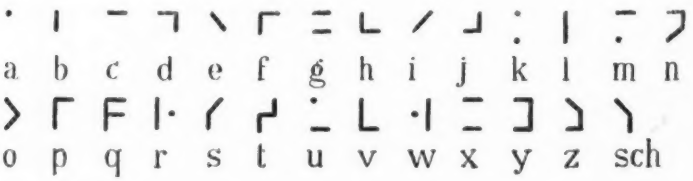
(*k* + ⠂ = *u*; *l* + ⠂ = *v*; *n* + ⠂ = *y*; *u* + ⠂ = *z*)

⠥ ⠧ ⠭ ⠽ ⠵ ⠺ = *W* is *r* reversed

u v x y z

In the books the distances of the letters from each other are hardly greater than the distances of the points of one and the same letter from each other, *e. g.*, ⠝⠥⠗ = *nur* (German for "only"). The tip of a finger 15–17 millimeters broad, therefore, in the preceding word "*nur*" covers, when its central part rests on the "*u*," not only the "*u*" but also the second perpendicular row of the "*n*" and the first perpendicular row of the "*r*" ⠗. As the end of the finger is round below, , the points of the "*u*"

lying in the middle will impress themselves deeper into the finger end and affect it stronger than the points of the letters on either side "*n*" and "*r*." *A finger having a very acute sense of touch will also feel the weaker impression of the letters on either side and mix up the letters, i. e.*, not know which points belong to one and the same letter, whilst a finger not possessed of *so acute a sense of touch will hardly take notice of the weaker impressions* produced by the letters on either side. In order to prevent such mistakes, which make the requirement of reading very difficult if not impossible to persons who have become blind later in life, I have had a book printed where, for the benefit of such blind, relief-*line* types have been used, combining or uniting the points to make figures:



But we find in Griesbach's tables in 33 blind out of a total of 37—but only in 5 seeing out of a total of 56—the observations, "If the impression is weak, there is no sensation of touch;" or "if the impression is below 2, below 5 g, the blind can make no exact statements as regards the sensation of touch," etc.

This discovery—*and it is decisive*—we owe to Griesbach's æsthesiometer working on springs. With the ordinary compasses which were formerly used in the few measurements that were taken this fact *could not be ascertained.*

The four blind, concerning whom we find no such observations, had not made much progress in reading, *i. e.*, they had only read when they were obliged to, or had just begun to learn reading. The epithelium of their forefingers had, therefore, not yet become thick. We find among them again case XLVII, which shows the shortest distances (left, 1 millimeter; right, 0.5 millimeter).

I must here insert the remark that the ability to read by no means furnishes a standard for skill or talent for manual labor. The best readers are, as a rule, the worst workmen.

From what has been said above, it appears beyond a doubt that for learning to read with the fingers, the sense of touch should not be rendered very acute, but it needs rather to be blunted.

A seeing person cannot read books printed for the blind, *for the reason* that he receives too lively an impression of the points *on either side,* therefore *feels too much.*

An Italian physician, Dr. Ferrai, has recently in examining some deaf ascertained that the acuteness of touch increases with age. Up to what limit, he does not say.

A person who thoughtlessly, or wrapped in deep thought, wanders through the streets of a populous city, "sees" the surging crowd before him, to the right and to the left, and after all has not seen anything properly, because his field of vision was too extended, because he could not fix any one impression. A finger possessed of an acute sense of touch experiences the same when brought in contact with the swarm of points of the type for the blind, whilst the blunted reading finger may be compared to the weakened sense of hearing which only hears the blasts of the trombones and the thumping of the kettle drums in a full orchestra. Practice makes perfect, and practice in our case means nothing less than the thickening of the epithelium, and the weakening of the sense of touch connected therewith, *presuming the degree of acuteness of the sense of touch can be determined by æsthesiometric measurements.* I feel sure that this assertion will in those large circles which cannot tear themselves away from the dear old faith, be considered as heresy. But its correctness is proved beyond the shadow of a doubt by Griesbach's experiments and my knowledge of the blind on whom these experiments were made. It is also confirmed by the fact that when the blind want to distinguish dry goods—silk, wool, cotton—they do not, as a rule, use the reading finger as the organ of touch.

I will candidly confess that not a very long time ago I considered the best readers as possessed of a particularly acute sense of touch, and that I felt like *a burglar in a church when I first penned with a palpitating heart the above statements.* I had never been able to explain to my own satisfaction why the best readers generally show no skill in manual labor, and even show themselves clumsy in the common acts of everyday life.

Not until I critically examined Griesbach's tables were my eyes opened.

I only regret that the measurements were not extended *to the ends of all the fingers of both hands, and to persons of greatly differing age.* This *must* be done at some future time, so as to corroborate the results gained so far.

This omission has since been corrected. During the Whitsun-

tide holidays of 1902, Griesbach took measurements on 2 blind and 3 deaf in the Institution for the deaf and blind at Weimar, and this time extended his investigations to *all fingers.* The results, which reached me only a few days ago, are as follows:

Born blind; age 12 and 13; figures express millimeters:

	Forehead.	Cheek-bone.	Point of the nose.	Thumb.		Little finger.		Ring finger.		Middle finger.		Fore-finger.	
				Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.
I. 12 years.....	5.5	8.0	4.0	2.2	2.2	1.3	1.4	1.2	1.2	2.0	2.0	1.5	2.3
II. 13 years.....	5.5	7.5	4.0	2.7	2.2	1.2	1.3	1.2	1.2	1.5	1.5	2.0	2.5
Average.....	5.5	7.75	4.0	2.45	2.2	1.25	1.35	1.2	1.2	1.75	1.75	1.75	2.4

Average of distance for all fingers: 1.745 millimeters. Average for the 7 non-reading fingers, 1.45 millimeters.

The supposition expressed by me *that the distances for all non-reading fingers must be shorter than for the reading finger has therefore been proved to be well founded.*

Deaf of the age of 10, 12, and 13 years; figures express millimeters:

	Forehead.	Cheekbone.	Point of the nose.	Thumb.		Little finger.		Ring finger.		Middle finger.		Fore-finger.	
				Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.	Right.
10 years.....	8.5	12.5	4.5	2.5	2.5	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
12 years.....	8.7	12.0	4.0	2.0	2.0	2.2	2.2	2.5	2.5	2.2	2.3	2.0	2.0
13 years.....	8.5	10.5	3.5	2.5	2.5	2.5	2.2	2.5	2 5	2.3	2.2	2.5	2.5
Average.....	8.23	11.7	4.0	2.33	2.33	2.23	2.13	2.33	2.33	2.23	2.23	2 23	2.23

Average distance for all fingers, 2.26 millimeters.

It should be stated that these observations were taken during the vacation and that the pupils were not hard worked, either mentally or physically, prior to the vacation.

Whilst with the deaf there is *no essential* difference of distance for the different fingers (the average varies between 2.13 and 2.33), we find for the reading fingers of the blind distances of 2.4 millimeters, whilst the non-reading fingers, apart from the thumb, show an average distance of only 1.44 millimeters. According to Table IV, the latter approaches that of the seeing for both forefingers (1.3 mm.).

These measurements show furthermore that the deaf, by losing their hearing, have not gained anything as regards the acuteness of the sense of touch, but that, on the contrary, they have lost a great deal.

And this people called a vicariate of the senses!

One might be tempted to believe that I underestimate the value of the sense of touch and the capability of the blind. After the labor of more than twenty years with and for the blind, I think I do not deserve this reproach, if it ever should be made. I know from experience that today we are able to raise the normally endowed blind, also as regards scientific attainments, to the level of the seeing of the same age; and that, as regards technical acquirements and skill in those trades which are open to them, they are very little behind the seeing. The sense of touch accomplishes *much more* and *much less* than outsiders generally imagine. Usually the blind are considered as sorcerers and idiots at the same time. They are neither the one nor the other, but human beings with reduced strength (for, where one member suffers, all suffer), but who, by a *careful education*, by *diligence* and *perseverance*, not through magic power, are able to a great extent to recover of what nature has deprived them. How erroneously the blind—and the sense of touch in general—are judged even by prominent men of science, is shown by the words of a man like Wundt, quoted by Griesbach; Wundt is of opinion that the sense of touch which always remained at a low grade of development in the seeing, reaches a development in persons born blind "which, as regards the acute power of distinguishing, rivals the regions of indirect sight of the sides of the retina." (Wundt: Menschen- und Thierseele, p. 167.)

That is by far too much and by far too little! When we walk through a street or through a forest and look straight ahead, we involuntarily see with the sides of the retina to the right and the left, above and before us, millions of objects in *indistinct outlines* which are not accessible to the sense of touch of the blind. But those objects which are placed in the hands of the blind, and are enclosed by

them, are grasped by the sense of touch *as they are and not as they seem,* whilst to the eye, when we move round about them, they assume different forms from second to second, because the eye only sees perspectively and by projection. A globe is and remains to the feeling hand a globe, but to the eye it is an unevenly lighted flat circle. A suitably shaded circle in a drawing therefore produces an optical illusion, and appears to the eye, on the strength of numerous experiences of the sense of touch, as a globe.

Spherical bodies which are not accessible to the sense of touch have, therefore, for thousands of years been considered by men as circular disks—the moon, the sun.

Some years ago I received from Vienna a number of intagliated plaster casts of relief medallions of historic personages. After inspecting them for some time, it suddenly struck me that at one time I saw them intagliated and then again in relief. To obtain the certainty that this deception was not simply caused by a peculiarity of my eyes, and also with the view to convince some seeing persons of the fallibility of sight, I placed these plaster casts against the wall, so that they could be seen in front from some distance, but could not be touched.

I then called two of my seeing colleagues and showed them the beautiful "relief casts." They shared my admiration, and did not notice that something was wrong until I laughingly asked them to take a little closer look. Then of course they discovered that these casts were made in entaglio and not in relief. They would of course not have made the mistake if they had thought of the direction of the light, *i. e.,* the location of the window. I made similar experiences in innumerable cases, when for some time I looked steadily at the back (the hollow side) of my zoological relief objects. The sense of touch will never make such mistakes. A blind person with a practiced sense of touch, who carefully goes over an exact model of the Vosges mountains or the Alps, gets a much more correct and "more plastic" *total impression* of these mountains than a traveler who by rail travels a thousand times from Basel to Strassburg, or passes through the Alps, but who only gets a side view of the mountains (in projection on a vertical plane), and never from above (in projection on a horizontal plane [map]) as a whole. Only the impressions are of a different kind.

Impressions received by the sense of touch cannot be compared with impressions received by the sense of sight. They are as different from each other as painting and sculpture, but, like these, of

equal value. The seeing person can do a thousand things which a blind person could not do; just as the blind can do many things which the seeing could not do in the dark, because every conscious action or labor is a result of the mental life which, as far as space is concerned, in the seeing is mainly built up by impressions from light, but in the blind by impressions from touch (attempts to see by persons born blind, on whom an operation has been performed). The eye from a suitable distance takes in the largest and smallest objects as a whole, and only afterwards analyzes them; the sense of touch does not take in very small objects; and those which are so large that they cannot be enclosed with the hand or show complicated forms it only takes in *gradually*. The sight as such furnishes *groups* of impressions, whose component parts lie side by side in a plain; the sense of touch furnishes, as far as larger objects are concerned, a *series* of impressions, the parts of which follow each other in order of time, and which are only grouped by a psychical act (synthesis). Sight is the sense of plains, touch the sense of bodies.

A person blind from birth can easily have correct impressions of bodies, whilst it is much more difficult for him to get an impression of a plain. A "*touch*-blind person, born as such—I don't know whether there are such persons—would probably by means of sight get a correct impression of plains, but no impressions of bodies. In a person endowed with all his senses impressions from sight and touch blend to one grand total impression comprising both plains and bodies; so that impressions by sight also reproduce closely related impressions by touch, *i. e.*, impressions of bodies, and *vice versa*. When we "see" the *front* of a house, *i. e.*, when we perceive the waves of light which are reflected from this front, we say: "I see the house," because we no longer separate the impression of a body produced by the sense of touch from the impression of a plain. Sight and touch, which belong together, but which according to their nature are intended to receive totally different impressions of the outer world, may therefore supplement each other, but never *take each other's place*. There can, therefore, not be any vicariate of these two senses, although they are so close to each other that sight has frequently been termed "touch from a distance." Much less can hearing take the place of sight, for these two senses are totally different.

Hearing alone cannot produce any impressions of space, although it can locate the direction of the sound with tolerable accuracy. The distance of the source of the sound is not determined by

the ear itself, but is estimated—in most cases very inaccurately—by the strength of the sound. But the impressions of space, on which this estimate is based, have been gained by sight and touch.

The blind person, of course, gets his defective impressions of larger spaces by the sense of touch, when the feet as organs of touch in connection with the "sense of the muscles" (Muskelsinn)—length of the steps—are taken into consideration. But these two senses do not furnish direct impressions of space, but only material for such. Here likewise intelligence has to come in as the formative power by the aid of numbers and time. As far as hearing is to serve the communication of men with each other, it is destined only for the perception of conventional groups of sounds (words, etc.) for impressions and ideas. It is true that only too often teachers of the blind entertain the erroneous idea that words *produce* impressions of space and of objects; there is too much talking and too little object-teaching. The former is, of course, much easier. There can, therefore, be no talk of the ear taking the place of the eye. And that the loss of sight does not strengthen and sharpen the sense of hearing, as regards space, has been proved by the locating of the direction of the sound and the distance at which sounds can be heard.

The greater attention which the blind person gives to insignificant noises, which can guide or warn him, does not seem to influence his organs of hearing. The attention is a psychological and not a physiological element.

The view that the loss of one sense, of itself and always, *i. e.*, by natural necessity, strengthens the other senses; that, for instance, the energy having, so to speak, become disposable by the non-use of the nerves of sight, passes over to the nerves of the other senses, just like the property of a dead child passes to his brothers and sisters and increases their possessions, has by Griesbach's investigations been shown to be erroneous—as far as smell, sight, and touch are concerned.

He states the following in his conclusions (16), which I here give in full:

1. In the faculty of distinguishing impressions produced by touch, there is in general no essential difference, as regards the time free from labor, between blind and seeing; small differences speak in favor of the seeing.

2. In persons blind from birth the acuteness of the sense of touch is somewhat less than in seeing persons; in a few cases the rest of the sensorium also suffers in persons blind from birth.

3. The blind have a less acute sense of touch in the tip ends of the forefingers than the seeing; and in the blind, in many cases, there is a difference between the two forefingers, as regards the faculty of receiving impressions.

4. The blind need, especially as regards the hand, a stronger impression than the seeing if a distinct impression of touch is to be produced.

5. In the power to locate the direction of the sound there is no difference between blind and seeing.

6. The ability to locate the direction of the sound varies in the blind as much as in the seeing, and in both is to a very great degree shaped by the individuality of each person.

7. As a general rule, the direction of the sound is determined by the blind and seeing more accurately by hearing with both ears than only with one ear.

8. There is no difference between the blind and seeing as regards the distance at which a sound can be heard and located.

9. There is no relation between the distance at which sounds can be distinguished and the ability to locate them, either in blind or seeing.

10. There is no difference between the blind and seeing as regards the acuteness of the sense of smell.

11. The blind to a greater degree get tired by manual labor than the seeing of the same age.

12. The blind of the same age get tired quicker by manual labor than by mental work; this is not the case with the seeing of the same age.

13. There is no essential difference in the degree of tiredness by mental work between the blind and seeing of the same age. Slight differences speak in favor of the seeing.

14. Both among the blind and seeing there are persons without, with few, and with many erroneous observations. In examining the various parts of the skin, most of these erroneous impressions are received by the cheek bone; very few by the ends of the fingers.

15. The number of erroneous impressions, both in the blind and seeing, increases with the increasing number of irritations (Reize) and increased pressure.

16. Sharp points often produce in blind and seeing erroneous impressions more frequently than blunt points, etc.

Professor Griesbach has expressed himself with the utmost caution in these conclusions, probably with the view not to be considered

as a prejudiced opponent of the general opinion; for it is a fact that his tables as to *acuteness of touch* and ability to locate show a very considerable superiority of the seeing; in the forefinger of the right hand this superiority varies between 0.42 and 0.90, or applied to the average "distances" of the seeing, between 40 per cent and 138 per cent. (Figures in the table express millimeters):

		Seeing.	Blind.	Difference.	Per cent.
Table LX and Table LXII.	Holiday	0.95	1.37	0.42	44
Table LIX and Table LXI.	Manual labor..	1 40	2.0	0.60	43
Table XLII.....	Holiday	0.65	1.55	0.90	138
Table XLII.....	Mental work...	1.36	1.91	0.55	40

These are the "small" differences in favor of the seeing!

In looking over these figures, we are involuntarily reminded of the words of Scripture: "Whosoever hath, to him shall be given, and he shall have more abundantly; but whosoever hath not, from him shall be taken away even that he hath."

Griesbach's conclusions Nos. 11 and 13 deserve a closer examination.

No. 11 agrees with the results of the measurements, but it has not the significance which could be assigned to it, and which has been assigned to it. The conclusion reads: "The blind, to a greater degree, get tired by manual labor than seeing of the same age."

According to Table LXII, the total "distances" of *seeing*, examined in *free* time, therefore, under normal conditions, amounted, in millimeters, to $2.5 + 2.5 + 0.9 + 0.9 + 2.93 + 1.1 + 0.95 = 11.78$.

In a state of tiredness after manual labor (Table LXI) we find for the *seeing*: $4.2 + 4 + 4 + 1.55 + 1.32 + 4.43 + 1.5 + 1.4 = 18.70$.

The difference between the normal and the tired condition therefore amounts to 6.92 millimeters or 59 per cent of the normal length of "distances." The *coefficient of tiredness, i. e.*, the figure by which the normal figures would have to be multiplied to find the degree of tiredness, is 1.587.

In the *blind* the total of the "distances" in *normal conditions, i. e.*, of rest, is, according to Table LX, $3.2 + 3.2 + 1.5 + 1.4 + 3.15 + 1.2 + 1.37 = 15.02$, whilst the total of "distances" after work in a workshop, according to Table LIX, is: $5.97 + 5.84 + 2.275 + 2 + 6 + 1.7 + 2 = 25.78$.

Difference between normal and tired condition: 10.76 = 71.7 per cent.

Coefficient of tiredness: 1.716.

The difference is, therefore, not very great, and is caused by the prolongation of the "distances," already long, as regards the forehead, cheek-bone, and thick part of the thumb. *After mental work* the proportion is reversed in a very striking manner. Conclusion No. 13 does, therefore, *not* agree with the figures.

For the *blind* the total of the "distances" in normal conditions is, according to Table XXXVI, 3.6 + 3.7 + 1.7 + 1.5 + 3.79 + 1.29 + 1.55 = 17.13.

After mental work, Table XXXV: 4.5 + 4.9 + 1.86 + 1.72 + 4.80 + 1.49 + 1.91 = 21.18.

Difference between normal and tired condition, 4.05 = 23.6 per cent.

Coefficient of tiredness: 1.236.

For the seeing (Table XXXVIII):

Normal condition of rest: 2.3 + 2.4 + 0.9 + 0.9 + 2.4 + 0.83 + 0.8 = 10.53.

After mental work, Table XXXVII: 4.2 + 4.4 + 1.55 + 1.36 + 4.1 + 1.36 + 1.38 = 18.35.

Difference: 7.82 = 74.2 per cent.

Coefficient of tiredness: 1.743.

Strange to say, the percentage for the seeing is three times as large as that for the blind, whilst it says in No. 13 of Griesbach's conclusions that there is no essential difference, and that there are slight differences in favor of the seeing.

This phenomenon can hardly be sufficiently explained by physiology; some psychological elements will have to be brought in and taken into account. It can only be explained by the closer attention of seeing pupils (many blind are inclined to indulge in day dreams), possibly also by a tiredness of the eyes, which, *e. g.*, in writing, are actively engaged as well as the hand, whilst the blind, in writing from dictation, or from memory, properly speaking, exercises no organ of sense, but simply the muscles of the forearm.

For the present it will be well not to draw general conclusions from these figures, because at this time it is impossible to state accurately what instruction preceded these measurements.

Under all circumstances, nothing that has been stated can be cited in support of a vicariate of the senses. Only taste and *touch*

can therefore be taken into account. Griesbach has not examined the organs of these two senses. It might be found difficult to find incitants on which the organs of these two senses react in the same manner, though to a different degree. It has recently been attempted by Italian physicians by means of the electric current and different solutions—bitter, sweet, salty. But they do not seem to have obtained any very important results; at any rate, they have not shown any superiority of the blind. To make a second examination of these results, it would, under all circumstances, be necessary to know the strength of the current, the consistency of the solutions, as well as—on account of the persistence of the sensations—the duration of the interruptions between the various experiments; and also the order in which the solutions above referred to were applied. I have never heard that the blind are considered special gourmets; for if this were so, some one would surely have proposed to appoint them on vessels not only as fog compasses, but also as kitchen inspectors. They would doubtless prefer the last-mentioned positions. Possibly from reasons of economy, people have not ascribed to them magic powers.

Nor has an investigation been made concerning the sensibility of the nerves of the skin as regards differences of temperature and resistance of the atmosphere. Possibly it would pay to supplement the ingenious experiments of Th. Heller.

It is well known that totally blind persons who move about freely in comparatively rare cases bump their head against anything. Our pupils play and run about almost like seeing children in the yards and gardens, where there are many trees, and which are mostly enclosed by walls or buildings. Of course, occasionally they run against something—this world was not made specially for blind people—but as a rule they "notice" the hindrance and get out of the way in time. It was thought that this fact, known for a long time, could not be explained by the use of the known senses, and the necessity was felt to ascribe to the blind a seventh sense—"the sense of distance." For more than a century mystic speculations regarding this (non) sense have produced fantastic and many-colored blossoms, but no fruit. In reality, as Th. Heller has also shown, the question is only to use the well-known senses attentively, more especially the capability of touch of the skin of the face (sensation of pressure) and of the sense of hearing. Differences of temperature and the sense of smell are occasionally made the subject of observations. The blind themselves cannot tell how they notice im-

pediments in their way before they touch them; all they can say is that they "feel" them. But they become uncertain and clumsy if, from some reason or other, they must be "blindfolded," or when the ground is covered with snow (or with some other matter which weakens the sound). As soon as there is snow on the ground, even those who know the court best will lose their way in it. How can the fact be explained that to cover up the "eyes," and possibly a part of the forehead, weakens the assurance of the blind? Is the only cause this: that a portion of the skin of the face is covered and that, consequently, the space exposed to the air is *diminished? Experiments* relative to these questions *would have to* be made in the *air bath,* where therefore there would be a much *larger space of exposed skin.* Or is it possible that the nerves of sight, not yet completely dead, play a part in this matter?

Is it not possible that these remnants of the nerves of sight are more sensitive to differences of temperature and to the suddenly increased resistance of the air than the nerves of the skin? (As a teacher of the blind, I address these questions to medical men.) It is evident that in rapidly approaching an impediment—tree or wall, etc.—a temporary condensation of the atmosphere, respectively a back current, is created. Every sharpshooter knows how his rifle rebounds when he aims at a firm, if even distant, object. Even the leafless branches of a tree or shrub increase the resistance. Do the seeing feel such a pressure of the air when rapidly approaching an impediment as certainly as the blind? (In slow approach, even, the blind person runs against objects much easier.) The question remains open, however, whether we are confronted with a superiority of the blind in a *physiological* sense, or whether the psychic element of greater attention on the part of the blind produces the difference. I am inclined to believe the latter.

The sound of steps which changes in the neighborhood of a wall probably has more importance as a warning signal—at least it comes sooner—than the sensations of pressure on the skin of the face. The lack of assurance which shows itself when the floor of the room is covered by a new carpet or the ground is covered with snow proves this.

The so-called "sense of distance" (Fernsinn) is, therefore, only the *sum of all the observations by the senses* which indicate to the blind and to the seeing, when compelled to take notice of it, the approach of danger; you might just as well speak of a "warning sense."

A (physiological) superiority of the sensorium of the blind over that of the seeing has so far not been proved, even as regards taste and touch. But even if experiments in this regard should prove a superiority of the blind, it would hardly be sufficient to make up for the deficit of the other senses, which has been clearly shown by Griesbach. Even then we could not speak of a general sharpening of the sensorium through the loss of one sense; otherwise the loss of hearing would act on the other senses so as to refine and sharpen them, and the loss of the two most important senses would strengthen the others in a very noticeable manner. The results of the measurements show that this is not the case in our deaf-blind. The uncertain swaying walk of the deaf-blind—they generally walk like persons who are drunk—seem to show that the sixth sense, the "sense of equilibrium," has also suffered, *i. e.*, that the *"hydrostatic balance"* (Wasserwage) in the labyrinth of the ear is out of order, which again permits a conclusion concerning the often unknown cause of deafness. Recently two Italian physicians, Dr. Carlo Ferrai, of Genoa ("Sul compenso sensoriale nei sordomuti"), and Dr. Cesare Rossi, of Como ("Sulle durate del processo psichico elementare e discriminativo nei sordomuti"), have examined a *large number* of deaf and hearing persons, and have arrived at the same result. Dr. Ferrai has examined the sense of touch, the "muscle-sense," the "sensation of pain" (caused by the electric current), the sense of smell, and the sense of taste (bitter, sweet, salty). In his "conclusioni" he lays special stress—and refers to Griesbach—on the fact that a "compenso sensoriale," a vicariate of the senses, exists just as little in the deaf as in the blind.

Dr. Rossi expresses his conviction, based on the observations and experiments made by himself and others, that, to say the least, the *strength of sight* of the deaf is not superior to that of hearing persons. He also calls to mind many cases where deafness and blindness go together.

Where one member suffers, all suffer! How could it otherwise be explained that deafness and blindness so often go together. For a number of years, 5 to 6 per cent of our blind have been also deaf; others are hard of hearing; whilst otherwise, among 1,000 persons, hardly more than three deaf (3 per 1,000) are found. This cannot be proved with absolute accuracy, because the term "deafness" is just as elastic in its meaning as "blindness." To the oculist a person is blind who cannot distinguish day from night; to the teacher of the blind, any one is blind who cannot see sufficiently to work by the

aid of the eyes. I therefore consider the statistics of the blind and the deaf as entirely unreliable as long as a fixed standard has not been established. Most parents hesitate to enter the words "blind" or "deaf" in the census blanks.

Thanks to the thorough and conscientious investigations of Griesbach and others, the dogma of the "vicariate of the senses" falls to the ground; like many another dogma which for centuries has ruled this or that science, it has had to give way to the results of scientific investigation.

And who would regret this? Those who by nature have been deprived of one or more of their senses are not benefited either by an *overestimation* or an *underestimation* of their capacities.

The ruins of the venerable building will probably for many years to come look down into the valley from the sunny heights of pedagogical and other wisdom, but finally time will also level these ruins!

THE COLLEGE OF TEACHERS OF THE DEAF AND DUMB, LONDON.

By Frank G. Barnes, Homerton, London.

To every student of the question of the education of the Deaf, the great advance made during the past thirty years in the British Isles, must be well known; but it is probable that many of the readers of the Association Review are less familiar with one of the causes which gave a tremendous impetus to that forward movement. This was the establishment in 1885 of the College of Teachers of the Deaf and Dumb.

Colleges for the *training* of teachers of the Deaf had already been established at Ealing and Fitzroy Square, London, and both these Colleges were issuing diplomas to the students who graduated; but they were private enterprises, directing their courses solely to the advancement of the Oral method, and many of the students who passed through the periods of one (or two) years' training in theory and practice afterwards became private governesses to the deaf children of better-class parents.

The great majority of the teachers of the Deaf who were engaged in the Schools and Institutions of Great Britain and Ireland at that date, however, had received their only training and experience *in the schools themselves.*

Entering as junior teachers, they had received from the principal, or some of his experienced assistants, a certain amount of instruction and guidance in their work, and after a few years had emerged from the novitiate stage to that of a full-blown practitioner.

For these junior teachers in Institutions there was a need for some means of focussing their attention on a regular course of study, and for some common "standard," in order to synchronise the varying methods of training and preparation for young teachers in the different schools.

The inception of the College was entirely due to Dr. R. Elliott, of Margate, and the late Rev. Dr. William Stainer, of London, and the preliminary stages cannot be better described than in the words of one of the founders at the first meeting of members at the City Guilds Institute, South Kensington, on Saturday, July 4, 1885:

"Mr. Elliott said it might be desirable that he should make a statement as to the ideas which had prompted the foundation of the College. Teachers of the Deaf were an isolated class. There had been very little recognition of their services. They had no status and were left to labor on with very little of encouragement or appreciation. It seemed, if possible, desirable to terminate such a state of things. And for this end it appeared to be proper to endeavor to raise the whole body of teachers into a recognized profession. Other educational bodies obtained a status from the possession of a certificate of qualification. The first step, therefore, was to organize a body of examiners to give such status to those who could show that they were in possession of the necessary qualifications. The work was of an exceptional nature and called for exceptional qualifications. Such, in the case of other special workers, were fully recognized. Of this the Royal Colleges of Surgeons and of Physicians were examples. But there was as yet no College of Teachers of the Deaf and Dumb.

"Impressed with these views, Mr. Stainer and himself sent round a circular to the headmasters of Institutions, containing a draft scheme, and asking for their hearty co-operation in the formation of such a College. This was received with all but universal favor, and produced many valuable suggestions, all of which were taken into careful consideration. It became, then, a principal object to secure the nomination of an examining body.

"Another circular was, accordingly, sent to the headmasters, with a request that they would nominate five gentlemen as examiners and committee. The result was the nomination of Mr. Elliott, Mr. Howard, Mr. Schontheil, Mr. Sleight, and the Rev. W. Stainer."

The scheme for the formation of the College received careful consideration by these appointed gentlemen, and was issued in the following form:

COLLEGE OF TEACHERS OF THE DEAF AND DUMB.

It is intended to hold the examination of this College early in July next at Stainer House, Paddington Green. Teachers who intend to sit for examination are requested to send their names, with particulars, to the registrar—Mr. Elliott, Margate—not later than the 1st of June. The following is the scheme of examination:

No certificate will be granted to any candidate who fails to give satisfactory evidence of knowledge and ability in regard to subjects marked *a, b, c, d, e, f.*

(*a*) The History of the Education of the Deaf and Dumb.
(*b*) The Principles of Education.
(*c*) The Intuitive Method of Teaching Elementary Language.
(*d*) The Method of Teaching Advanced Language.
(*e*) The practical instruction of a class (with blackboard illustrations).

(*f*) The Mechanism of Speech, with the Anatomy and Physiology of the Organs.

(*g*) The Method of Teaching Articulation.

Examination in the following will be optional on the part of the candidate:

(*h*) The making and understanding of natural signs.

(*i*) The ability to read finger spelling.

The College Certificate will specify the subjects in which the candidate has passed.

Due notice of days and hours of examination will be given.

In addition to the issue of this syllabus of subjects of examination, a list of books recommended for study was issued to the teachers intending to present themselves for the test.

For the first examination 13 teachers presented themselves, and of these 11 showed sufficient ability to be judged fitted to hold the diploma of the College, and at the first meeting mentioned above the certificate was awarded as follows.

(1) Forty certificates to headmasters of Schools and Institutions, and to other teachers who had been engaged in the work for a period of over 10 years.

(2) Fourteen certificates, awarded on application, to the teachers already in possession of diplomas issued by the existing training Colleges.

(3) Eleven certificates to the successful candidates in the examination.

The first President was Dr. John Stainer, at that time organist of St. Paul's Cathedral and one of the inspectors in music to the British government. His chief interest in the work was due to his brother, the Rev. Dr. Wm. Stainer, but he only retained the office until the young College had become firmly established. He was succeeded by Mr. Wm. Woodall, M. P., who held the office from 1887 to 1901. Mr. Woodall was one of the Royal Commission on the Education of the Deaf and Dumb, and there can be no doubt that his intimate acquaintance with the aspirations of the teachers, through the medium of the College, influenced and strengthened his efforts to make the report strongly in favor of the nationalization of Deaf education, and also to assist in the passing the act for the "compulsory" education of Deaf children in 1893.

On the death of Mr. Woodall, Mr. Sleight, of Brighton, the oldest British teacher of the Deaf, held the position until failing health compelled his retirement, and Dr. Elliott was induced to take

the proud position of President of the College, to which he had given a quarter of a century of devoted service.

Year by year the College has carried on an efficient examination of teachers, and nearly 400 teachers of the Deaf have submitted themselves as candidates and duly received the "hall-mark" of proficiency—the diploma of the College.

From the first it was intended that the examination should be no sham, and I well remember the trepidation with which young teachers went in for the practical teaching test, and the stringent *viva voce* examination which followed it.

Dr. Wm. Stainer, Schontheil, the Rev. Thos. Arnold, and the late Mr. Howard, of Doncaster, were a quartette before whom any tyro in the art of instructing the Deaf might well quake when called upon to air his knowledge—or ignorance.

The examinations have always been conducted with the utmost impartiality, and usually the written tests have been conducted in such a manner (by means of a *nom de plume,* or otherwise,) that the identity of the candidate was unknown to the person marking the papers.

Practically every teacher of the Deaf in Great Britain has been proud to possess the diploma of the College, and this diploma, with the "seal" of the College (depicting the story of EPHPHATHA, and designed by a Deaf and Dumb artist), has held a place of honor in the sanctum of every headmaster.

The second Annual Report of the College contained the following paragraph:

"Much satisfaction has been expressed by the heads of Institutions on the beneficial effects in their schools, traceable to the influence of the College, and this has given great pleasure to its promoters. The proofs that it successfully met a real want are seen in the eagerness with which its certificates and diplomas have been sought for and the importance which is already attached to them. They are regarded with marked favor by several Committees, and by the one, which is most influential, it has already been made a rule that every member of their permanent teaching staff shall possess, or must obtain, the Certificate of this College."

The Committee of the College is annually elected by the members, and from the Committee the examiners have been selected in the past. These officers at present are: President and Rgistrar, Dr. Elliott, Margate; Assistant Registrar, Mr. E. Townsend, Birmingham; Committee, Dr. W. H. Addison, Glasgow; Mr. F. G. Barnes,

officier d'Academie, Homerton; Mr. B. P. Jones, London; Mr. S. Kutner, London; Mr. A. J. Story, Stoke; Mr. A. Wright, Newcastle; Mr. A. Sleight, Brighton, and Mr. William Sleight, of Brighton, as patron of the Institution.

A few years ago it was felt to be undesirable that there should be three examinations of varying standards for teachers of the Deaf, and the Committees of the Training Colleges at Fitzroy Square and Ealing were invited to appoint representatives to discuss the question whether it would be possible to establish a "Joint Board of Examination" for the three Colleges. The negotiations for the attainment of this object took some time, but were happily successful, and this year instead of the students at the Training Colleges being examined separately by their own examining boards, and the candidates for the College of Teachers' diploma being examined by that body, *one* combined examination has been held, and thus ONE standard of attainments and qualifications has been established for future teachers of the Deaf.

The Joint Examination Board has issued a "scheme," embodying the whole of the syllabus of the College of Teachers of the Deaf and Dumb, excepting that portion referring to Finger-spelling and Signs. The Oral Association at Fitzroy Square and the Training College for Teachers of the Deaf at Ealing, being both purely ORAL organizations, it was felt that they could not combine in dealing with that subject, and the matter was compromised on the following lines: that all candidates should be examined and, if successful, certified by the Joint Board on the following subjects:

(1) History of the Education of the Deaf.

(2) Principles of Education Generally, including their special application to the Deaf, and Elementary Psychology.

(3) Mechanism of Speech and the Method of Teaching Articulation.

(4) The Method of Teaching Language to the Deaf.

(5 Anatomy and Physiology of the Organs of Respiration, of Circulation, and of Speech. The Ear. The Nervous System.

(6) Practical Teaching and *viva voce*.

And the College of Teachers' representatives should separately examine any candidate desiring to be tested in the ability to make and read Signs and use the Manual Alphabet, such efficiency to be attested by a foot note on the certificate and signed by the examiners of the College only.

The examining body of the Joint Board is to consist of three

representatives of each of the three Colleges, and it is arranged that there shall be one representative of each body on each rota of three appointed to deal with each subject of the examination.

The College of Teachers of the Deaf and Dumb has performed a most useful work in the past, and the gratitude of every British teacher is due to Dr. Elliott and the late Dr. Stainer for their foresight in conceiving the idea of the College and their executive ability in organizing it and carrying it on so long and so successfully.

Under the new arrangement the College will still exist, receive applications from candidates desiring to be examined, and if their credentials appear satisfactory, and if they conform to the regulations of age and length of experience as teachers of the Deaf, the College will then hand them on to the Joint Board to be examined.

One of the aspirations of British teachers is that when the examination of the Joint Board is firmly established it may receive government recognition, and that the day may come when there shall be no teacher on the regular staff of a school for the Deaf who does not hold a diploma as a fully qualified teacher of the Deaf.

AT THE CONSTITUTION HOUSE; OR, THE UNWELCOME GUEST.

By a Teacher.

The day clerk of the Constitution House, at Ogden, was late that morning. He was also cross; in his rush he had forgotten his diamond. With feverish haste he opened the register and pasted on the first blank page therein a label bearing this legend:

Friday, July 10, 1908.

Then he hurried home for his badge of office. During the absence of the clerk, a stranger walked up to the desk and began to finger with the ancient pens, which caused a harmless potato to assume the aspect of the fretful porcupine. Before he could decide which pen would spatter the least ink, he heard a voice at his elbow: "Do you intend to register here?"

"It seems that I have to," replied the stranger. "There is no other place for me in the city."

"Well, it is a rule of the house that no one shall be entertained here unless by the unanimous consent of the permanent boarders. What is your name?"

"Walker Resolution."

"Where are you from?"

"South Carolina."

"And your business:"

"To prevent the use of the sign-language in the school-room. Who are you?"

"I am Section First, one of the permanent boarders of the Constitution House. My business is to secure 'the harmonious union of all the teachers of the Deaf.' I am afraid you will cause discord if allowed to remain. To be candid, I don't like your name or your business."

"So you object to the name 'Resolution'?"

"Not at all. Resolutions are more common than Smiths among us. It is the word 'Walker' that suggests agitation to my mind. 'Resolution' is all right. Why, we have some Resolutions among our permanent boarders. At various times we have entertained

Good-Fellowship Resolution, Compliment-the-Host Resolution, Adulate-the-Cook Resolution, Self-Praise Resolution, Mortuary Resolution, and Resolution Galore. General Resolution we have had with us time and again. He is a charming old fellow and never hurts any one's feelings."

"But suppose I could benefit the Deaf by remaining?"

"That is not the thing; harmony is what I want."

Then Section First walked away, shaking his head and muttering: "I don't like that fellow's looks; I don't like his looks."

"Walker Resolution," said Section Fourth, another permanent boarder, "I am opposed to your staying here. We 'stand committed to no particular theory, method, or system.' We make it an invariable rule to entertain no one who advocates anything definite about teaching the deaf."

"If you cannot give me lodging," said the inquiring stranger, "perhaps you can at least give me a little information. What *do* you advocate?"

"Everything, or nothing—as you please to look at it. My motto is: 'Any method for good results; all methods and wedded to none.'"

"What does your motto mean?"

"I am not quite sure, but it is a very pretty motto."

"Very pretty; does it mean that all methods are good?"

"I think may be it does; I am sure it does; of course, it does."

"Should all methods be used in the same school?"

"I don't know about that, but all methods should be used somewhere in the country. I do not like to be specific."

"But suppose we find that the best results are found in the schools where certain specific methods are used to the exclusion of others?"

"In such cases I should concede the quality of the work, but I would insist that the superior results were obtained, not on account of the narrow, specific methods, but in spite of them."

"Then is no one method any better than any other?"

"I have no choice. I am wedded to none; I coquet with them all."

Walker Resolution again inquired, with disagreeable persistence: "Will you please tell me, Section Fourth, how you gained admission to the Constitution House?"

"I was placed here by the members of the Flint Convention."

"All of the members?"

"No, but a majority of them."

"Suppose a majority of the members of the Ogden Convention should demand my admission?"

"That would not make any difference. It is my business to keep the majority from making that kind of blunder."

"Were the members of the Flint Convention better informed in regard to modern methods of teaching than the members at Ogden?"

"Undoubtedly, or they would not have placed me here to keep out disagreeable persons like you. If I should permit you to remain I should lose my place of honor as a permanent boarder."

"You forget, my dear Section Fourth, that we do indorse most heartily 'the system of instruction existing at present in America.'" The last speaker was a permanent boarder by the name of Resolved I.

Section Fourth hastily retired from the lobby of the hotel.

"What is the matter with your friend?" inquired Walker Resolution. "He seems to be afraid of you."

"Oh, he always gets excited and hurries away when he sees me or my brother, Resolved II, talking to strangers."

"I am delighted with the harmony of your house," continued Walker Resolution, "and I am sorry that I shall not be able to remain with you. By the way, tell me about this 'American system' you are so enthusiastic over."

"With pleasure. It 'includes all known methods and expedients that have been found of value in teaching the Deaf.'"

"Then you approve of everything that is done in American schools?"

"Everything that has been found of value."

"Who decides what is of value and what is not?"

"Everybody, anybody, nobody."

"But a moment ago Section Fourth said that he would lose his place if he allowed any one to stay here while adhering to any particular system. I should think that either you or he would have to leave."

"Yes, I suppose it does look that way to a stranger; but the people who put Section Fourth here told him not to inquire into the affairs of my brother and me. I was indiscreet awhile ago; instead of saying 'we approve of the great American system,' I usually say, 'it commends itself to the world.'"

"But that really means the same thing."

"Of course, everybody knows that; but I must have some consideration for Section Fourth's feelings. He is very sensitive and feels very keenly the embarrassments of his position. He knows it is his duty to keep away persons like my brother and me, but he has been told that *we* are not to be molested. Sometimes, when he is in the depths, I tell him that this 'American system' is really not a system at all; that it is merely lumping together everything we can find and calling it a system, from lack of a better word."

"I see. Very thoughtful of you. You say this system 'commends itself to the world.' How does the world look on it?"

"As the best there is. The world is always visiting our schools."

"Which schools in America does the world like best, those in which all methods are used, or those in which English is the only language used?"

"The world is full of prejudice. You ask entirely too many questions."

"So you, too, Mr. Resolved I, will vote against receiving me at the Constitution House."

"No; to be consistent, I'll have to vote to receive you. I have adjusted myself to so many that I suppose you will not put me to any great inconvenience."

"Thank you for this cordial concession. I am reaching the point where even ice-water seems warm. I hope your brother will be equally tolerant."

" 'Tolerant' is not the word," sounded a cheerful voice; "I feel, Mr. Walker Resolution, that you have as much right here as I have."

"You are Resolved II, I suppose," said Walker Resolution, addressing the amiable speaker.

"Yes, better known as California Resolution. I took on considerable flesh at Flint; that is probably why you did not recognize me. My business, as you may have heard, is to see that 'every deaf child has an opportunity to learn to speak and to read the lips.' "

Walker Resolution hastened to assure the friendly permanent boarder that he and his work were well known, but was desirous of knowing how he had managed to gain admission at the Constitution House.

"Oh, that was easy," the other explained. "I was admitted at Berkeley, and nobody objected to me in the least."

"How about Section Fourth?"

"He has instructions not to give me any thought, or to meddle with me in any way."

"But isn't that irregular?"

"Certainly, it is irregular; but 'what is the constitution between friends?' Everybody knows I am doing good, and they sent me here on that account."

"What about the pure manualists?"

"A long time ago they would have given some trouble, but now there are so few of them that Section Fourth decided to ignore them."

"Section Fourth seems to be like the average policeman; he knows when to look the other way."

"I told you he had his instructions."

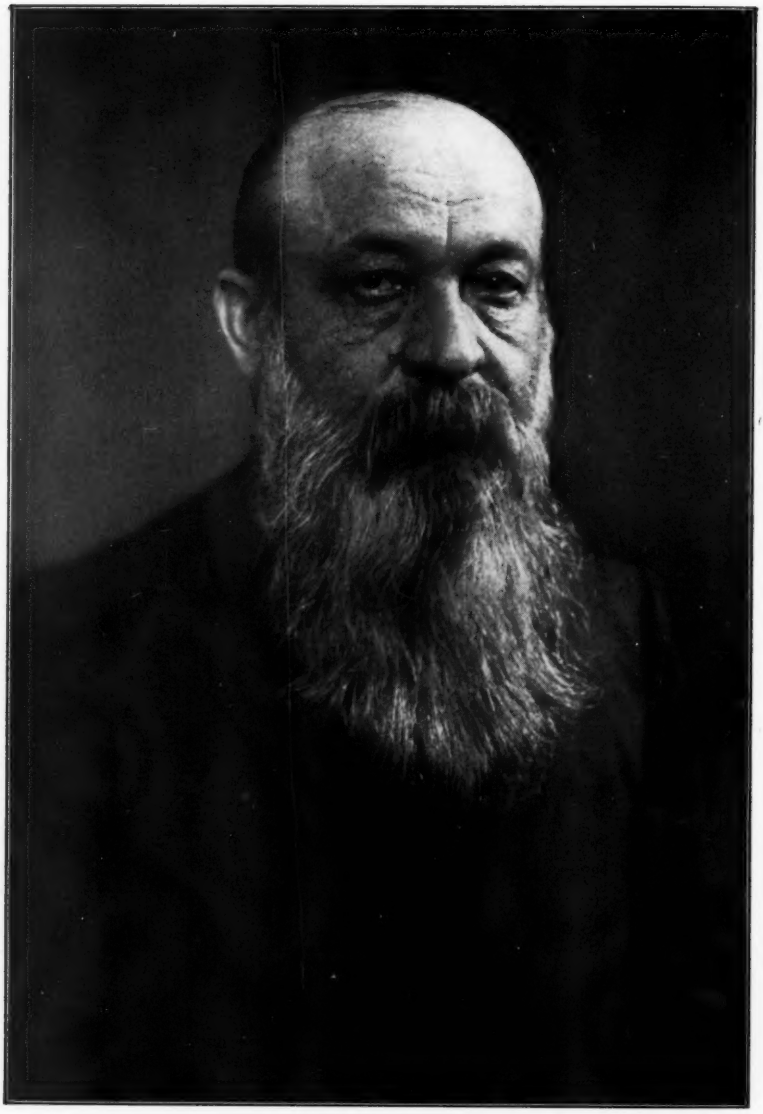
"Then why, Mr. California Resolution, can't he wink at me as well as you?"

"He can if he will, and I hope he will. You could help me wonderfully in my work, and there are other fields where you are needed. I fully believe—"

Just then the day clerk, who had been talking with Section Fourth, came upon the scene. Without a word, he caught Walker Resolution by the collar, gave him a shove, and kicked him into the street.

"What's the matter?" asked several bystanders.

"Matter! Matter enough!" panted the day clerk, as he felt for his diamond. "Smallpox has broken out in South Carolina, and this fellow has never been vaccinated!"



EDUARD WALTHER

(1840-1908)

A FEW WORDS UPON THE PEDAGOGIC SYSTEM OF WALTHER.[1]

By I. Landrain, Berchem Ste-Agathe, Belgium.

Signs.—One would think that Walther, one of the greatest oralists of our time, abhorred signs. To be sure, he was of the opinion that in teaching deaf-mutes and in conversing with them signs should be repressed, because this inaccurate form of communication is a hindrance to the acquisition of spoken language, but he recognized, nevertheless, the great help which the use of signs renders to the victims of deafness. We shall not take the time to discuss here the advantages and disadvantages of the sign-language; that has often been done. We shall merely give some of Walther's opinions on the use of signs in the instruction of the deaf.

The deaf, he said, should be obliged to make as much use of speech as they possibly can, for obligation begets habit, habit leads to spontaneous use of speech, and ends by finding pleasure in oral expression. But where articulated language does not exist—in the case of children, for instance, who have just entered school—signs to which they have been accustomed must, of course, be permitted, since there is no other way of communicating with them.

Gestures and motions which hearing children naturally use in conversation are not signs, properly speaking. The imitation of certain actions (running, walking, striking, falling, etc.), as well as the representation of certain visible qualities (size, form, etc.) by signs is not to be taken for sign-language either. All these are permitted in the instruction of the deaf, as are also the signs which hearing children use and understand. Walther attached great importance to natural signs, and especially to facial expression. He disapproved of the coldness and immobility with which certain teachers, under the pretense of not wishing to make use of signs, teach their lessons. A teacher who does not know how to give much expression to his face, Walther maintained, will not make a good instructor of the deaf, for the oral method demands a great deal of adroitness and ingenuity in this respect especially.

[1] Translated for the Association Review from "Revue Belge des Sourds-Muets," with the permission of the author.

Although in his opinion the conventional sign-language should not be used in the schools; teachers of the deaf should, nevertheless, be familiar with it and know how to apply it. "Even if the sign-language is not used in the institutions," he said in his Pédagogie, "the teacher should, notwithstanding, possess this means of communication. When he has to address a great assembly of deaf-mutes, whether educated or not, whether making use of articulated language or hardly knowing it at all, when he has to assist deaf-mutes before the courts, when he converses with deaf-mutes who are ignorant or have had little training, he is obliged to use the sign-language."

The exclusion of signs, he also said, is not a criterion which originated with the German method; it is only within the last thirty years that efforts have been made to abolish it. As a matter of fact, as long as the teaching of language was based upon grammar, it was difficult to do without it. But it would be erroneous to assume that we owe to the fight against signs the more favorable results gained in teaching. This improvement is above all due to the rational solution of numerous questions, such as the admission of pupils, the length of training, the didactic implements, the number of pupils in classes, the number of teachers, etc. "To fight signs is good; to work conscientiously is better."

Teaching of the Mother-tongue.—Contrary to the practice of certain teachers with whom the teaching of the mother-tongue is but a single branch, which they invariably call "language," Walther divided this instruction into several distinct branches, to be taught at different periods, according to the following scheme:

A. Sysetmatized teaching of language:
   I. Mechanical speech:
      1. Articulation.
      2. Mechanical exercises in pronunciation.
   II. Material teaching of language:
      1. Object lessons.
      2. Reading (and speaking).
   III. Formal teaching of language (Formeller Sprachunterricht).
      1. Oral: grammatical exercises.
      2. Writing: (keeping of a diary and) composition.

B. Extemporaneous exercises in speaking.

Walther, in justifying his system, said that unless this branch of instruction is logically divided it often happens that a teacher prefers certain kinds of lessons, cultivates one part more than another, is one-sided in his instruction; all of which is detrimental to the general knowledge of the mother-tongue.

Articulation.—Walther began his articulation instruction by teaching the elements—that is, the letters and their sounds separately. It must be remembered that certain German pedagogues, as Rössler, Schiebel, etc., started with the production of words (normalwörtermethode), which they divided into syllables, coming finally to the letters. This method is still followed by some at the present time.

Walther began with the mute consonants *f, s, sch* (= *ch*), *p, t, k, h, ch* (the pronunciation of which lies between the French *k* and *ch*). After these consonants had been thoroughly mastered, he proceeded to the development of the voice and to the production of the vowel *a*. Then the consonants alternated with the vowels, somewhat in the following order—(we say somewhat because according to Walther it is difficult to make a hard and fast rule for the teaching of letters, as it greatly depends on the aptitude and disposition of the pupils): *w* (which in German is often pronounced like the French *v*), *u* (French *ou*), *b, d, g, l, c, m, i, n, e* (which is often pronounced like the French *é*), *ng, j* (which is pronounced like *i* before the vowel by which it is followed), *r, ä* (French *è, ai*), *ü* (French *u*), *ö* (French *eu*).

Walther taught writing and articulation at the same time; thus he wished to fix the oral sign upon the memory and to convey exact knowledge of the spelling of the words. Not to teach writing in the beginning of the instruction of language would, according to him, be equal to depriving a cripple of his crutches, with which he cannot dispense. As a means of teaching he preferred lip-reading; the use of writing is to be restricted more and more as the pupil advances in the knowledge of the language; thus lip-reading is practiced, while at the same time the deaf are prevented from falling into the habit of thinking in written instead of in oral forms.

In contrast to his teacher Hill, Walther insisted upon teaching expressions and little sentences correct from the beginning, of course, the use of constructions such as: the eraser —— there, the stove —— hot, etc., not being prohibited.

Systematic Exercises of Articulation (Mechanisches Sprechen).—Apart from exercises in syllabation, which are of equal

importance with the teaching of elements and the constant correction of faulty articulation, Walther strongly advocated systematic exercises in articulation during the first four years of study (the courses of the institutions generally take eight years). Six or eight hours during the first two years and two hours during the two following years are to be devoted to these special exercises, each lesson comprising: *a,* exercises in gymnastic respiration; *b,* systematic exercises in articulation; and, *c,* exercises in pronunciation, applied to well-known expressions and phrases, turns of phrases, orders, proverbs, sentences, numbers, conjugations, colloquialisms, etc. Some of the systematic exercises in articulation are as follows:

a a a a a a a a a a a a a a etc.
i i i i i i i i i i i i i i etc.

â â â â â â â â â â â â â â etc.
ou ou ou ou ou ou ou ou ou ou ou ou ou ou etc.

a â a â a â a â a â a â etc.
a a â a a a â â a a â a a a etc.

af af af af âf af âf etc.
fa fa fa etc.
faf fâf faf fâf etc.

a ou ou i o a é o etc.
a é i a o ou è eu u etc.

papapapapa etc.
tatatatata etc.
mimimimimi etc.

one expiration being sufficient for each series. Our readers will easily comprehend the value of these exercises for the pitch of voice, its modulation, accuracy of emission, rhythm, etc. These special exercises are to be applied to all the phonetic combinations, principally to those of the symphones, to all combinations of consonants, to the union of words, etc., and are practiced individually and collectively.

Object Lessons.—All teachers are agreed on the great importance of *intuition* in the teaching of the deaf. But the way in which it should be employed has given rise to a great deal of discussion among the German teachers. The rule for primary schools for hearing children is to base the teaching of language on reading. The reading is given in such a way as to allow a great deal of intuition during the lessons. Reading, language, and intuition form in general one and the same branch of instruction. As a matter of

course, this system was adopted by many institutions for the deaf. Walther was strongly opposed to it. In teaching the deaf, he used to say, not the primary hearing schools should be our pattern, but the Mother's school. Hearing children have learned to talk before entering school; the deaf do not even possess the first elements of language; they have never felt the need of talking. We must not only induce them to observe, but we must also furnish them numerous pictures, so as to create in them the desire to express themselves; we must satisfy their curiosity and resort to constant repetitions in order to fix the expressions upon their memory. Reading books, moreover, cannot provide us with a choice of objects for observations sufficiently numerous, sufficiently varying, and adapted to the wants of the deaf pupils and to the situation of various institutions; and, besides, it is illogical to base the acquisition of language on book reading. Walther, therefore, strongly advocated the system in which intuition is treated as a distinct branch of instruction and the basis of the elementary teaching of language. How much time is to be given to it, the choice of objects for the lessons—to be made, of course, from the surroundings of the child—the method to be pursued in this course, are topics which he has remarkably well elucidated in his Pædagogie.

As to the method to be followed in object lessons, he is vigorously opposed to the way of certain teachers who constantly ask questions of their pupils. For an answer it generally suffices to modify the order of words given in the question or to complete a phrase. Such a mechanical way must needs do great harm to the spontaneousness of language. One sentence correctly composed by the child himself is better than ten answers to questions propounded to him.

Reading.—The great majority of institutions for the deaf begin the regular course in reading with the second trimestre of the second year. According to Walther, it is better not to begin this course before the third year. Taste for reading may only be developed if reading is not begun prematurely. The difficulties of articulation, the explanation of the ideas, the grammatical exercises, are too heavy burdens to be laid upon the pupil at the same time. Language first, reading later!

According to him, the reading books used in the schools for hearing children, simple as they may be, are not suitable for the first year in reading in the institutions for the deaf. These classes need primary books, especially published for young deaf children,

and illustrated works carefully compiled by experienced teachers. It is only in the higher classes that one can make use of the readers used in public schools.

Walther was convinced of the great importance which reading may have for the instruction of the deaf in school, and especially in after life, and it was his advice that the institutions should use all possible means to develop in their pupils the taste for reading. The teachers should form it by the practice in reading of popular works, which are moral, interesting, and instructive. During the last two years which they spend in the institution the pupils should be obliged to read at a given time outside of class work books selected for them by their teachers; this study should be carefully controlled. Each institution should be provided with a library for the use of the pupils. Moreover, during the two last years one hour each week should be devoted to reading of newspapers.

Practical Teaching of Grammar and Composition.—According to some critics, Hill, the reformer of deaf-mute teaching in Germany, was at fault in neglecting the systematic, practical teaching of grammar. It is evident that one should not teach the deaf definitions or rules; everything that does not tend to develop understanding of the language and facility in expression should be banished from the classes of the deaf. But it is, nevertheless, absolutely necessary that they should actually know the main features of the conjugation of verbs, the declensions and variations of the articles, the pronouns, the substantives, the adjectives, the participles, the use of prepositions (in German some prepositions govern the accusative, some the dative, and others the genitive), the conjunctions, the degrees of comparison, etc., and that they should become familiar with certain turns of phrases which are chiefly learned through grammar. This is what our German colleagues designate by "formeller Sprachunterricht" (the formal instruction of language), in distinction from "materieller Sprachunterricht," based on intuition and reading. Walther demanded that with the beginning of the third year two hours each week should be devoted to it, apart from useful observations in this direction which the teachers might take occasion to make during object and reading lessons. But it is especially with regard to the deaf that Herder's maxim should be practiced: "Grammar is learned through language and not language through grammar." No theory then, but practice. The study of grammar is to be made by means of well-chosen examples. Those which have no meaning for the children, those which they do not

understand, and expressions which are not constantly used ought to be rigidly discarded.

Composition.—Walther considered composition also an important branch in teaching the deaf. The value of an institution for the deaf, he said, is often tested by articulation. The way in which pupils are able to express their thoughts in writing should, however, also be taken into serious consideration, and the teacher should take pains in cultivating this branch. The first written exercises are to be based upon the instruction in object and reading lessons, and are chiefly intended to fix upon the memory the matter and the instructions taught during those lessons and to facilitate repetition. The special exercises intended to develop the written expressions of ideas are to begin with the fourth year. The pupils are to keep a diary, in which they briefly relate the little events of their every-day life. Gradually these notes are to be superseded by the description of events which were of interest to them in school, in their homes, or on the street, etc., calls, walks, anniversaries, markets, storms, accidents, bathing, forests, flowers, etc. After some time they will attempt to compose little descriptions, narratives, and stories. A regular course of training in style should, however, not be undertaken before the sixth year.

Spontaneous Exercise in Language.—We close this little sketch with a few words about conversation. It must not be neglected in any lesson; the teacher must know how to take advantage of numerous little incidents and events in order to teach through them customary forms of expression. Apart from this incidental teaching, Walther demanded that after the second year two hours a week should be devoted to spontaneous exercises in language—narration, conversation, gossip, dialogues. Well directed by an able teacher, these unconstrained uses of language may greatly facilitate readiness of expression and spontaneity of language with the deaf.

THE INSTITUTION PRESS.

THE COLLEGE OF TEACHERS OF THE DEAF AND DUMB, LONDON.

Examination Questions of the Joint Examination Board.

[In England there exists a "Joint Examination Board," made up of leading educators of the Deaf, before whom come annually under-teachers in the schools as candidates for a "certificate" of capacity. As we understand it, the examination is submitted to voluntarily by teachers, but the fact that a goodly number take it annually attests the high value placed upon the certificate when it is won. The list of questions given at the last examination, in July, we reproduce from The Teacher of the Deaf. An article by Mr. Frank G. Barnes, printed elsewhere in this issue, explains fully and clearly the history and functions of the College of Teachers.—F. W. B.]

History of the Education of the Deaf and Dumb.

1. What was the nature of the earlier attempts to instruct the Deaf and Dumb? State where the first organized schools for such children were established in France, Germany, England, and Scotland, the teachers of those schools, and the method of instruction they followed.

2. Who was the pioneer of deaf-mute education in America? What do you know respecting his reception in England and Scotland when seeking to acquire the art of teaching the Deaf and Dumb? What was the outcome of this, and what did it lead to? Supply any information at your command as to the worth and character of two of his sons.

3. What single method of instruction has been persistently and rigidly followed in Germany? Do all German teachers, as well as the Deaf and Dumb themselves, regard these restrictive procedures with approval? What evidence can you adduce in support of this?

4. Up to the passing of the Acts of 1890 and 1893, how had the education of Deaf and Dumb children been carried on and maintained in Great Britain? Give as concisely as you can the leading provisions of the English (or Scotch) Act; and state what you conceive to be the advantages: as also any defects in giving effect to legislative enactment, having regard to the character of the official inspection, the grant-in-aid, or any other attendant circumstances.

5. What credential has been obtainable in Great Britain during the last 20 years, certifying a teacher's competence to instruct the Deaf and Dumb? What bodies conferred these certificates? State what important modification of their separate and independent action has recently been effected, and give your views as to the results you consider should accrue from this change.

Alternative Questions.

6. What course was followed by certain school authorities on the passing of the Acts to provide suitable educational facilities for the Deaf and Dumb children they then became responsible for? Has this mode of carrying out their obligations since grown in favor or the reverse? Give your reasons for thinking so.

7. What position should you assign to the United States by the comparison with other countries in the liberality of equipment of their schools and efficiency of the work and educational results obtained? In what respects do their Institutions differ from those in England?

Five questions only to be answered.

Mechanism of Speech.

1. Give a complete list of all the sounds of which the English spoken language is made up; classify these sounds and state in what order you would develop them in a deaf child.

2. Describe the production of each articulation and vowel in the following words: "examination," "sprinkle," "chain," juncture," "yield," "file." What difficulties would you be likely to find in developing these sounds in a deaf child; how would you contend with these difficulties?

3. Differentiate between (*a*) vocal articulation and vowel sounds, (*b*) continuous and explosive sounds, (*c*) lingual and labial vowels.

4. What difficulties would a deaf child be likely to find in pronouncing the following words and how would you deal with these difficulties?

"Singing," "scissors," "judge," "yes," "sixty," "enquire."

5. To what extent can a deaf child be taught modulation, emphasis, tone and rhythm, and how?

Alternative Questions.

6. Define nasality. By what means would you correct this fault in a deaf child's articulation?

7. Describe in detail the difference in the position of the vocal organs in producing the sounds "O" (on) and "OO" (hoop).

8. Give the phonetics and describe the vowel formations in "she came the same way yesterday."

The Method of Teaching Language to the Deaf.

1. Give two sets of notes of a lesson on a "Bee":—the first set to be suitable for a 3rd year class, and the second set for a 6th year class.

2. Give an outline of the language you would employ, and the forms of language you would teach the children in connection with K. G. occupations such as mat-plaiting, clay-work, and simple needlework.

3. Mention some of the difficulties that deaf children encounter in a simple narrative, &c., read for the first time from School Readers for ordinary children.

4. In the statement, "My father has a watch," what questions should a pupil be able to ask at the end of the 4th year?

5. Explain the use of suffixes in word-making, and show by examples how you would avail yourself of them in extending the pupil's language.

6. Explain in terms suitable for an advanced class of pupils the difference between—

Friend and acquaintance,	True and truth,
Kindness and generosity,	Well and health,
A present and a prize,	Credit and creditable,

To taste sweet and to smile sweetly.

7. Explain when and how you would begin to teach Short Division. Give an example of your method of working on the blackboard, and the language you would employ.

8. How would you correct the following of a deaf child's language:

"The weather was hails and the snow last week."

"The bird sits in the nest and warm on its eggs."

Five questions only to be answered of which 1, 2, and 7 must be taken.

Principles of Education.

1. Define Education, Instruction, Training, indicating modifications (if any) in the aim and scope of each which the deprivation of hearing necessitates.

2. Contrast the mental condition of the congenitally deaf child with that of the hearing, in each case before direct school instruction commences; and state what, in your opinion, is the most important provision to be made in the case of the former to obviate the disadvantages of his deprivation.

3. What are the various classes of deaf pupils found in our schools? State briefly how you would differentiate your instruction to meet their several requirements.

4. What special provision, do you think, it is desirable to make during the school period for manual (industrial) and physical training.

5. What is psychology, and in what respects may its study be advantageous to the teacher of the deaf.

ALTERNATIVE QUESTIONS.

2. How would you inculcate principles of morality in a deaf child?

3. The Imagination and the Feelings: how may these be effectually developed and trained?

PHYSIOLOGY.

1. How do sound waves reach the auditory nerve endings?

2. Describe the Cochlea.

3. In speech, how do the nose and the mouth modify the sound which has been produced in the Larynx?

4. Give a brief description of the Larynx. How is the human voice produced?

5. Give a brief description of the Chest and its principal contents.

In The Youth's Companion of October 1, there is an interesting article on "The Gift of Speech," by John Macy, a member of The Companion staff, editor of the supplement to Helen Keller's "The Story of My Life," and student of matters relating to the deaf and blind. He began with a description of a character of his town—a deaf and dumb man thirty or thirty-five years old, without an education and the object of ridicule and the children's "choice of a butt for laughter." In referring to this unfortunate man, Mr. Macy said: "Years before he could have been taught, if there was any school for the deaf in that part of the country. If there was not, then society was to blame; it was to blame in any case, for the deaf have been taught a century or more, and it is the right of every child, deaf or blind, to receive an education at the hands of the State. And parents and others in authority must see to it that there are no deaf children growing up in lifelong mental babyhood, growing to be strong men and beautiful women, forever isolated from the intellectual communion of men." Mr. Macy then calls attention to the wonders that can be wrought by proper teaching and cites an example—a young woman who had been deaf since early childhood, and who "graduated with honors from one of our best colleges." He once listened to her addressing an audience composed of men of letters and educators, and some in the audience understood what she said, but many could not have understood all the words for it was an "artificial speech." He points out at some length the early education of a child—hearing and deaf—comparing the advantages of the one over the other. In referring to the slow progress in the early education of the deaf child, Mr. Macy reminds us that it takes longer to spell than it does to speak. We admit this and would add that it takes longer (for the deaf) to articulate than it does to spell. Mr. Macy has treated the subject in an impartial way—not going to that extreme to which a good many of those treating the subject of speech for the deaf are accustomed to go.—[North Dakota Banner.]

Fully half of the pupils in one of two beginning classes this year range in age from 16 to 28, and two of them are little short of six feet in height. They have to work side by side with little tots of eight or nine years, learning the same *cat, dog, cow,* etc. Such a spectacle arouses in the heart of the true friend of the deaf a feeling of indignation against the ignorance or folly that has kept such persons out of school during the golden days of their childhood, when learning would be easy and a delight instead of the almost hopeless task it becomes so late in life. In these days of the railroad, the telegraph, the telephone, and the rural free delivery, it does not seem as if there could be any valid excuse for keeping deaf children out of school.—[Companion (Minn.).]

The Oklahoma School has just opened its doors with an enrollment of 165 pupils. There are 15 teachers now, five of whom are new, Misses Ren, of Nebraska; Loggins, of Missouri; Lynes, of Texas; Messrs. Sayles, of New York; Hayes, of Kansas. A printer will be here next week. All the teachers have been shifted to other classes on account of the addition of the oral system which predominates and is a match to the manual system. Miss Brummit is the head teacher and principal of the manual system and Mrs. Hickman, of the oral system. The school is within one block of the city and 175 feet of the Platt National Park, which consists of 840 acres.—[Deaf American (Neb.).]

Last Tuesday the magnificent new gymnasium at the school for the blind was thrown open for the inspection of the friends of the school. It cost $40,000, and is very complete. In the basement there is a good sized swimming pool with full aquatic outfit. On the surface floor is a full equipment of the latest devices for physical development. Skirting this floor is a composition roller skating surface. In the gallery is a running track, but it may also be used by visitors at exhibitions. The program on opening day included addresses by some of the most prominent men of the city.—[Western Pennsylvanian.]

The New York Journal recently made the surprising statement that 80 per cent of the pupils of the New York (Fanwood) School were of foreign parentage. It is to be expected that in a cosmopolitan seaport city, and the one that receives the main stream of the incoming tide of immigrants, the proportion of foreign-born children in school should be large, but 80 per cent seems an abnormal number. Where do the native-born deaf come in? It looks as if this large foreign element, representing many nationalities, must present some problems that schools farther inland do not have to face.—[Maryland Bulletin.]

The oral department had rhetoricals in the chapel last Thursday. It was a Thanksgiving exercise. The third grade class told of the Pilgrims, their trip to this country in the Mayflower, their first hard winter, their first spring and planting time; their harvest and the first Thanksgiving day. Sixteeen boys and girls from four different classes recited "We are thankful," each one telling of something he was thankful for and then came a short recitation in concert by the sixteen boys and girls. Twelve pupils, from each of the upper classes, recited the Letter of Thanksgiving, each pupil reciting one verse holding up the letter representing his verse and all recited the last verse together.—[Deaf Hawkeye (Iowa).]

The latest news from Manila says that the building for the new School for the Deaf and the Blind is completed, and the school, with Miss Delight Rice as principal, is now well under way. She has a hearing native normal graduate as an assistant. English is the language taught. Miss Rice has to confine her pupils strictly to spelling and writing; once they break into signs, it is difficult to restrain them in their use.—[Chronicle (Ohio).]

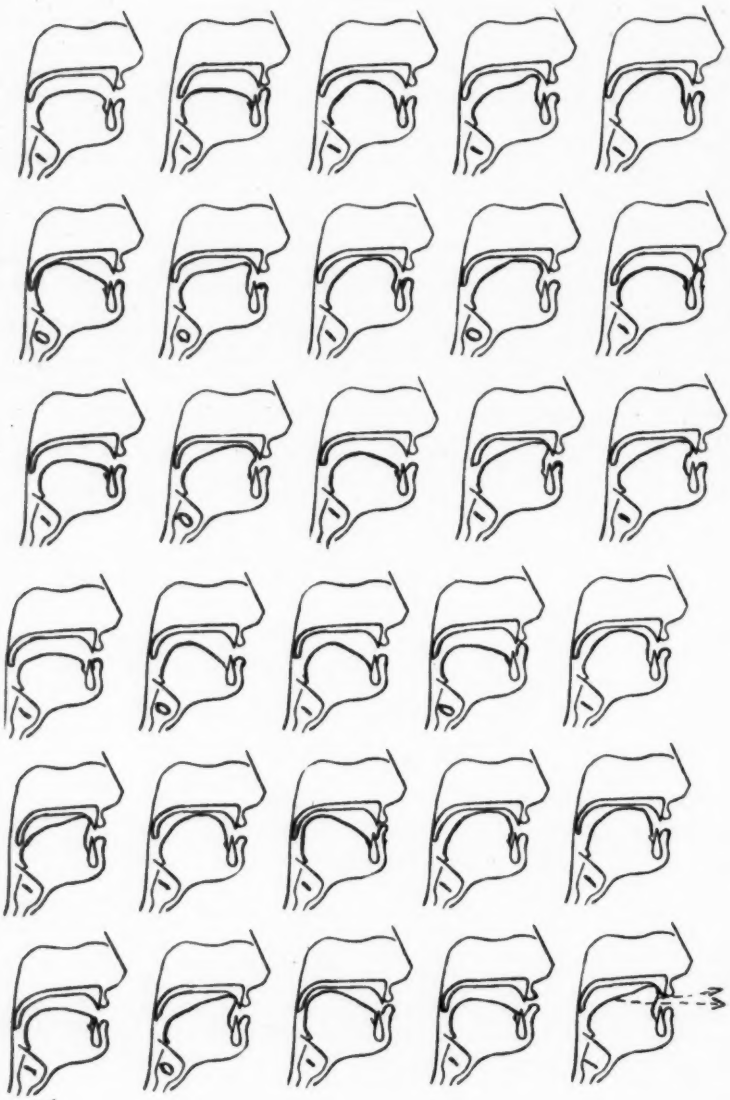
The Mississippi School observes December tenth, each year, as "Gallaudet Day," and on this occasion invites some prominent deaf person to come to Jackson and deliver an address before the school. This year, Dr. J. L. Smith, of the Minnesota School, has been chosen.—[Missouri Record.]

St. Olaf College, Northfield, Minn., has a department for the deaf which is in charge of A. O. B. Molldren, a graduate of that college and a former normal fellow of Gallaudet College. The aim of the department is to give such deaf students as are enrolled an academic education.—[Ohio Chronicle.]

The St. Louis Board of Education has decided to pay car fare for children who live a mile or more away from the school they attend. This will include deaf children who attend Gallaudet Day School.—[Missouri Record.]

THE MELVILLE BELL MEMORIAL DEPARTMENT.

M. GARDINER, EDITOR.



"BEHOLD, I BRING TIDINGS."

[1] One of the first things that the Cat did was to go and call on the Man, who was sitting by the Cave, and he said to the Man, "O Man, I am a Cat that walks by myself, and all places are alike to me. Give me food at once." And the Man said, "Then why don't you come and help the Dog hunt the Cow?" And the Cat said, "I am a Cat that walks by myself, and all places are alike to me. But I will come and help you hunt the Cow on one condition only: that you will build a fire-proof house for me to live in, and that you will never, never chase me with sticks or throw shoes at me." And the Man said, "That is a fair bargain. Come along, Cat." And the Cat said, "Wait till I see the fire-proof house before I promise to come any further." Then the Man built a fire-proof house for the Cat to live in, and the Cat went with him to the Cave, and watched him milking the Cow, and then said, "Now give me some milk." And the Man said, "Then why don't you come and help the Dog hunt the Cow?" And the Cat said, "I am a Cat that walks by myself, and all places are alike to me. But I will come and help you hunt the Cow on one condition only: that you will build a fire-proof house for me to live in, and that you will never, never chase me with sticks or throw shoes at me." And the Man said, "That is a fair bargain. Come along, Cat." And the Cat said, "Wait till I see the fire-proof house before I promise to come any further." Then the Man built a fire-proof house for the Cat to live in, and the Cat went with him to the Cave, and watched him milking the Cow, and then said, "Now give me some milk."

[1] Transcribed from "Just So Stories for Little People, by Rudyard Kipling; copyright, 1902." Illustrations reproduced by permission of Doubleday, Page and Company, New York, publishers.

ɐlɐ ɯoɹɟ-ɟɟ ɯoɹɟ ɐ ʇɐ ɹɐlnɔ ɯoɹɟ ɐ ɯoɹɟ ɐlɐ ɯoɹɟ ɐ ɯoɹɟ ɐlɐ ɯoɹɟ ɐ ɯoɹɟ ɐlɐ

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old and the new. Education must
be the product of the past and
present, and the future must
grow out of the present. The
best of the past must be pre-
served, and the best of the
present must be used to make
the future better than the
present. The true teacher
is the one who is able to
do this. He is the one who
can see the best in the past
and present, and who can
use it to make the future
better. He is the one who
can see the future in the
present, and who can make
it better. He is the one
who can see the past in the
present, and who can make
it better. He is the one
who can see the present in
the past, and who can make
it better. He is the one
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make it better. He is the
one who can see the past in
the present, and who can
make it better. He is the
one

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< O E [m
ɔlɹɯ ɹɯ ɒlɐɘɒlɔɒ ω] 3 O >

to that class of words which are spelled with the letter
w but which do not begin with that letter. Such words
are *who*, *whose*, *whom*, *whole*, *wholly*, *whether*, *what*,
when, *where*, *why*, *which*, *while*, *whim*, *whit*, *whisper*,
whistle, *whirl*, *whirlwind*, *whip*, *whisk*, *whiskey*, *whit-*
tle, *wharf*, *wheat*, *wheel*, *wheelbarrow*, *wheeze*, *whelp*,
whelm, *whet*, *whey*, *whig*, *whale*, *whalebone*, *wharves*,
whence, *whereabouts*, *whereas*, *whereby*, *wherefore*,
wherein, *whereof*, *whereon*, *whereupon*, *wherever*,
wherewith, *whereunto*, *whereat*, *whereafter*, *whereto*,
whereunder, *whereinto*, *whereout*, *whereover*, *whether*,
whetstone, *whetter*, *whetting*, *whereabout*, *whereunder*,
whereinto, *whereout*, *whereover*, *whether*, *whetstone*,
whetter, *whetting*, *whereabout*, *whereunder*,

The Psalm of Life.

Tell me not, in mournful numbers,
"Life is but an empty dream!"
For the soul is dead that slumbers,
And things are not what they seem.

Life is real! life is earnest!
And the grave is not its goal;
"Dust thou art, to dust returnest,"
Was not spoken of the soul.

Not enjoyment, and not sorrow,
Is our destined end or way;
But to act, that each to-morrow
Finds us further than today.

Art is long and time is fleeting,
And our hearts though stout and brave
Still like muffled drums are beating,
Funeral marches to the grave.

In the world's broad field of battle,
In the bivouac of Life.
Be not like dumb, driven cattle!

Be a hero in the strife!
Trust no Future, howe'er pleasant!
Let the dead Past bury it's dead!
Act, act in the living Present!
Heart within and God o'erhead.

Lives of great men all remind us
We can make our lives sublime
And departing leave behind us
Footprints in the sands of time;

Footprints, that perhaps another,
Sailing o'er life's solemn main,
A forlorn and shipwrecked brother,
Seeing, shall take heart again.

Let us, then, be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labor and to wait.

QUERIES.

Answers to Puzzles in the October Review.

First line: 1, Lip-shut; 2, low front; 3, point-shut, voice, nose; 4, point center-aperture, front center-aperture (or point "mixed"); 5, point divided-aperture, voice = ᗡ[ᙡᑌᘺ: (colloquial pronunciation of "pencil.")

Second line: 1, Lip-shut voice; 2, mid-back; 3, point-shut; 4, point-shut, voice, nose = ᘿ]ᗡᙡ: (colloquial pronunciation of "button.")

Third line: 1, Point-shut; 2, low back wide, round; 3, lip-shut, voice, nose; 4, voice (indefinite); 5, point center-aperture, front center-aperture = ᗡᎱᘿᑌ (Thomas).

Fourth line: 1, Point divided-aperture, front center-aperture; 2, high front wide; 3, back-shut, voice, nose; 4, back-shut = ᘺſᙡᗡ (think).

Fifth line: 1, Voice (indefinite); 2, back-shut; 3, mid back; 4, lip-shut = ꞁ ᗡ]ᗡ (a cup).

Sixth line: 1, Mid back wide, followed by glide towards high front; 2, point center-aperture, front center-aperture; 3, low back round; 4, front center-aperture, voice; 5, high back round = ᒐ ᑌᎱ ጠɬ (I saw you). M. G.

Argument upon "ch" and "j" being Simple, not Complex, Sounds.

541 Lexington Avenue,
New York, October 19, 1908.

To the Editor:

There is a class of Italians here that I am teaching in English-American History. From sheer self-interest I think I shall give them some phonetic drill. There are some twelve or fifteen of them, and some who have studied English for a year are still poor speakers, and some are quite ignorant of it and its sounds. I have a copy of "World English," and I wondered if it had ever been taught to foreigners. What would you charge for a number of copies by way of an introductory price?

I am sending below my arguments for the fact that *ch* and *j* are simple, not complex sounds. Will you also show it to Dr. Bell and let me know your own and his judgment on the argument?

Thomas F. Cummings.

In "Principles of Speech," p. 278, Ω and Ω are given as symbols for *ch* and *j*. That this is correct—*i. e.*, that *ch* and *j* are sounds from a simple, and not compound position, the following proofs are submitted:

1. All nations have heard them thus.

2. *Ch*, *j* can be made with the tongue protruding from the mouth, or doubled against the lower front teeth. Thus absolutely precluding any *t* which requires the *tip* of the tongue.

3. As all the other "stop" positions, *p*, *t*, *k*, have corresponding nasals; so does this. As *m*, *n*, *ng* answer to them, so does *ñ* (cañon) answer to *ch* and *j*.

4. Orthœpists give one pronunciation of suggestion as "sud-jestyun," owing really to the failure of the untrained English ear to catch the sound of *j j* and *ch ch* which we continually have in Hindustani. If one will say carefully "sud-jest," he will note the difference between that and sujjest. Hence this failure of ear accounts for the writing of *tch*, *dge*, as these actually are doubled in the participles, as is hit(ting), watching, judging.

5. The distinction between aspirated and unaspirated "stops" is a vital point in India and China, so we distinguish between *ch* and *chh*, *j* and *jh*, but never *sh* and *shh*, which is manifestly impossible as *sh* is already aspirated.

6. In the pharyngal exercise aspirates are silent, not stops; *ch* is audible but not *sh*.

REPLY.

We do not think it necessary to submit this question to Dr. Bell (who is at present abroad), for it is a matter on which experts differ, and some latitude on such points is always allowable.

The real question at issue is not how a certain sound should be written, but how it is *made*. If Mr. Cummings thinks that *ch* and *j* are made by "front-shut" (Ω) and "front-shut-voice" (Ω) he is entitled to write them so. If another orthœpist thinks they should be made by ΟΩ and ΦΩ he is also entitled to write them so. Either way they are perfectly intelligible to any one conversant with the symbols; and herein lies the great merit of this system of symbols. They represent the outlines of the instrumentalities employed in producing sounds, and when experts differ as to the positions assumed by these instrumentalities in forming particular sounds, they have in the symbols a ready and sure means of portraying and differentiating these positions by combining these elementary out-

lines in various ways, so that readers can adopt whichever rendering they consider most nearly correct. The proof of the pudding is in the eating, and if Mr. Cummings can get a satisfactory *ch* and *j* from his Italians by Ω and Ꝩ it is all that is wanted. The end gained, the means are thereby fully justified.

In his invention of the symbols, Alexander Melville Bell placed in the hands of all writers, whether philologists, orthœpists, ordinary literati, or writers of dialect stories, a wonderfully flexible and pliable tool by which to represent all different shades of sounds. They are to use it to express their own will—they are not to be mastered by it as one is by the fixed hieroglyphics of dead languages.

While Dr. Bell might possibly admit the technical justice of Mr. Cumming's contention that Ω and Ꝩ more nearly represents the actual positions assumed in sounding *ch* and *j*, it should be remembered that he has always taken strong ground upon the advisability of limiting the number of symbols employed for ordinary use. He has always held that teachers should concentrate their efforts on essential things, and that pupils should not be bothered and have their attention distracted by non-essentials. They become necessarily familiar with the Ʊ, Ʊ, and Ω symbols, and if with these teachers can get a sound sufficiently correct to pass muster among ordinary hearing speakers, it is not worth while to introduce another special symbol. For this reason he would probably continue to prefer the combination of ƱΩ and ƱΩ. For this reason also he advocates the use of the indefinite voice symbol ɨ in unaccented syllables, rather than more specific vowel symbols which portray very slight shades of differences like ɪ and ɪ. M. G.

Voice Culture.

Will you tell me of any books on "Voice Culture" for the deaf?

A. C. E.

[The above question was referred to Mrs. Sarah Jordan Monro, of Boston, who has kindly furnished the following reply.—Editor.]

The same question has been asked me many times, and I am glad that there is a growing interest in the subject. I have never found any works upon voice culture prepared expressly for teaching the deaf, but the best way, it seems to me, is to study the methods used in training the voices of those who hear, and adapt them to the

teaching of the deaf, for a normal deaf person--I mean one who has no malformation of his vocal and speech apparatus—has the same voice and speech organs as one who hears; also a mind to control those organs. However, time and effort would be saved if books upon the training of the voices of the deaf were prepared by a person who has adapted the methods. Some of the books that I would suggest as helpful are: *The Art of Breathing*, by Frank A. Tubbs; *Lectures upon Sound*, by Tyndall, especially chapter on vowels; *Voice, Song and Speech*, by Brown and Behnke; *Speech-Tones*, by Prof. A. M. Bell; *Principles of Elocution*, by Prof. A. M. Bell; chapters from works on physics for a knowledge of resonance. I should also recommend music and poetic-metre for rhythm; lessons in singing from a *good* teacher. My own little book of "Don'ts" has helpful suggestions, and last to be mentioned in my list, but of *very great* importance, are books upon the action of the mind as given in mental philosophies, its influence over the body in general, and the effect of its action upon the voice and speech apparatus. I would mention also, though I know of no published work upon it, a knowledge of harmonic gymnastics.

SARAH JORDAN MONRO.

By request we print herewith in ordinary type the verses which appeared in our October number, as it is suggested that "to do so would greatly encourage the learners to improve their translations."

TO A SEAGULL. THE SONG OF A SCOTTISH EXILE.

(*Written by A. G. B. before he became an American citizen, with help from Miss Laura C. Redden.*)

Bird of the Ocean, joyous and free!
Fly to the mountains of Scotland for me.
Fly to the land of the Findhorn and Spye,
To the ruins of Pluscarden,[1] ivied and gray,
And bring from the nook that in years past was mine,
But a leaf or a stone, for the sake of lang syne.

O! Pluscarden, Pluscarden, dear to my heart,
Though thousands of miles from my vision thou art,
I bear still thy image impressed on my brain,
And sadly I ask, Shall I see thee again?

O! had I but pinions, bold bird of the sea,
How gladly to Pluscarden I'd fly with thee.
On, on, and away, we two, o'er the foam,
No land would long hold me, save Scotland my home.

[1] A ruined Cistercian Abbey in Elginshire.

THE PROPER SYMBOLIZING OF R IN "DEPARTMENT."

Mr. Harris Taylor writes asking why we use the symbols Iɤ in the word "Department." I do not know why. They must have crept in inadvertently at first, and simply remained there unnoticed. I thank Mr. Taylor for calling attention to this matter and hope he will approve of the change made. M. G.

THE MYSTERY OF THE SEALED BOOK OF THE VOLTA BUREAU FINALLY SOLVED.

LETTER FROM MRS. MILLS, CHEFOO, CHINA.

TO THE EDITOR:

I was greatly interested in the account of "Bell's Symbols in Chinese," which appeared in the June number of THE REVIEW, and I thought I knew who the transcriber might be, so I sent a letter to the Rev. W. H. Murray, School for Chinese Blind, Peking, and have his reply, from which I quote:

"I am pleased to say *I was the author of that transcription into Bell's Visible Speech.* I had a class of young men who were reading their own language and the Gospel of Matthew in those symbols. A gentleman, the late Thomas Coats, of Paisley, Scotland, helped me in regard to the expense. I was a colporteur of the National Bible Society of Scotland, and after being on the streets during the day with the Scriptures, I spent the evenings teaching the Symbols. Mr. Coats was a great admirer of the system, and when he learned of my interest in it desired to meet the expense of introducing it in China should the opportunity occur, believing it would be of great value. In writing the symbols I expressed the tones by thick and thin lines."

Mr. Murray's attention was called, soon after the time of which he speaks, to the need of work for the blind, and to them he has given his time. Why he made no use of the Bell Symbols in teaching them I have never been able to understand. The system which he uses—one of his own devising—seems to me far less happy, as it requires the memorizing of a large list of arbitrary numbers. He has, however, done good work with it. Any system will succeed when the heart is in it.

The time seems to have come when something definite should be done in calling the attention of the Chinese to the Bell Symbols, for they are searching for an easier way to write their language. Among the missionary teachers, Romanization is being used to

some extent. A standard system has been agreed upon and books are being printed in it, and, I believe, a newspaper, but it is not entirely satisfactory. The sounds of the letters are too indefinite, and there are sounds for which no letter exists; take, for example, ɿ, which is much used in Chinese; in Romanization we represent it by a double dotted *i* (ï).

Some time ago Peng-I-Dzong (ᗡᒧᘓ-ᒥ-ᗱᘐᘓ), one of China's progressive scholars, now banished for having too radical ideas, invented a system of shorthand, which was favorably received by the people. Yuen Shi Kai, then in charge of the army, adopted it to be used in schools for the soldiers, but it was to be taught free of charge. Several books were printed in it, but after Peng's banishment it was dropped, and we hear nothing more of it. It was adapted only to the Pekingese, which limited its sphere of usefulness.

The meeting between Dr. Bell and Dr. Tenney and the happy incident of the unsealing of an unknown book proves conclusively all that is claimed for the symbols. I see in the system for China, not only an easier way of writing the language, but a method by which the pronunciation of the characters can be unified. What a boon that would be!

I am doing what I can, but it takes time. I expect to visit Peking, and shall stop in Tientsin as I pass through, where I hope I may see Dr. Tenney. It may be that we can arrange a demonstration of the use of the symbols.

I have my book in Chinese, corresponding to "Visible Speech in Twelve Lessons" in English, nearly finished. At present it is in the shape of wall charts, but I shall put it into book form after I have used it a while and made some revisions which it is sure to need. When I have it in shape, could I make arrangements to have it printed by the Melville Bell Memorial Department of THE REVIEW?

I shall take my charts with me; also a few of my pupils who can read the symbols, and one of my hearing teachers. We will be able to give them a very good illustration of the use of the symbols.

It would seem an opportune time for Dr. Bell to press the matter a little through the Chinese Minister in Washington, followed by a visit to China. He might be able to do a good deal in the way of getting it introduced.

I am greatly pleased with the "Melville Bell Symbols Depart-

ment." I think, though, that I should like capitals and punctuation marks to be used. I believe we would read it more easily.

I am sending you another copy of my books. You will notice that the first volume contains a preface by our mayor, Ho Yin Sing, with a translation of the same, which will be of interest. In the Chinese he makes more of the system, which he says anticipates exactly an idea of his own, than the translator has done.

Yours sincerely,

ANNETTA T. MILLS.

SCHOOL FOR THE DEAF,
CHEFOO, CHINA, Sept. 11, 1908.

NOTES AND COMMENTS.

POSSIBILITIES FOR THE SYMBOLS IN CHINA AND JAPAN.

What Mrs. Mills says in her letter, published on another page, of the possibilities of the symbols as a substitute for the cumbersome Chinese alphabet, is most significant. Practically the same word comes to us from Japan. There, too, is a gathering dissatisfaction with the ancient alphabet, and a movement is gaining strength slowly but inevitably leading to change. Now is the time for those who believe in the Melville Bell symbols to concentrate their forces to press its merits on the attention of the Chinese and Japanese authorities. The chances of the symbols entirely superceding for ordinary use the few and easily memorized Roman characters in European languages are remote. Another difficulty lies in the constitutional nature of our government, which renders a revolution in spelling by governmental order impossible. We all know what happened when President Roosevelt attempted to enforce reformed spelling.

In China and Japan conditions are very different. Their alphabet, instead of being formed of twenty-six characters, consists of many thousands. More than this, there are a number of alphabets in use. That employed for ordinary newspaper work contains nine thousand distinct characters, while that employed by the scholarly, highly cultivated classes has, it is said, twenty thousand. On an average it is estimated that it takes the first twelve years of a Japanese child's life just to memorize the different characters he must use if he is to be considered fairly well educated.

The need, therefore, of some simplification of the Chinese and Japanese spelling is infinitely greater and more pressing than our

own, and, proportionally, the chance of their adopting some simple form greater. As Mrs. Mills points out, our letters are not sufficient to express all the Chinese sounds, so that the difficulty of satisfactorily rendering Chinese sounds in our Roman characters is even greater than the difficulty we ourselves find in portraying all our own sounds by this means. Consequently, the adoption of our alphabet will not solve all the difficulties of the Chinese themselves in reading their own language, nor would it solve our own difficulties in learning it.

Since a change is to be made at all, it might surely be made to the very best, most scientific form, and this is the Melville Bell system of symbols.

The great difficulty again in the revolutionizing of our own spelling does not exist for the Chinese and Japanese, for their government is more or less autocratic and the people far less individualistic.

Some years ago when the bubonic plague invaded one quarter of Yokohoma, Japan, the people of that city woke up one morning to find this quarter surrounded by a high and stout rat-proof stockade. All the inhabitants of that quarter were removed from their houses and these were then burnt to the ground. No permission was asked, the government ordered it for the good of the whole people, and the order was carried out. No one thought of murmuring, outwardly at least. Of course, the plague was stamped out, and the result was worth what it cost in individual discomfort and loss. But imagine our central government undertaking such arbitrary, high-handed measures, no matter how necessary. It would be impossible. Here, then, lies the hope for the Chinese and Japanese in the matter of spelling reform. What the Japanese government has done before, it can do again. Should it decide that all Japanese spelling be done with Roman, or any other character, there is no doubt whatever that this order would be obeyed implicitly and absolutely.

Certainly here is something worth fighting for. Not to speak of the chances of permanent employment for those conversant with symbols, it is a cause worth the best energies of a man's whole life. What a grand thing it would be thus to revolutionize the spelling of great and ancient nations. How it would make for a closer intercourse and better understanding between the Occidental and Oriental nations, and the brotherhood of man. M. G.

CAPITALS AND PUNCTUATION MARKS.

Mrs. Mills writes: "I should like capitals and punctuation marks to be used" (in the symbols). This is a curious instance of the difficulty one has of disassociating one's self from the accepted and accustomed ways of doing things. The fact that English actually has two distinct and unlike forms, the written and spoken, is with great difficulty realized. Capitals and punctuation marks are among the distinctive features of the written form.

Now, the symbols aim to show to the eye the form which the ear takes in. We don't talk capitals. New York, for instance, sounds the same if written new york. Nor do we sound commas and periods; we simply pause for breath and we emphasize. So no capitals are shown in symbols and the pauses we aim to show by our spacing, which is of different lengths, corresponding to the natural pauses of speech. The emphasizing will be represented so soon as our present small stock of type warrants.

Once we have enough literature to accustom ourselves to the symbols, as to ordinary type, we will cease to miss the familiar signs.

M. G.

THE SYMBOLS IN JAPAN.

One of the firmest believers in the Melville Bell system of symbols for the purpose for which it was originally designed—to assist in the correct pronouncing of sounds in all languages by ordinary hearing persons—is a Japanese gentleman high in official position, Mr. Isawa. He has long advocated the adoption of the symbols by his government in place of Roman characters for reformed Japanese writing. He has already published Japanese books in which the symbols are used to a greater or less degree. While, therefore, we have no books corresponding to "German in Twelve Lessons," it might be possible that by applying to Mr. Isawa material would be obtained with which to master Japanese pronunciation. His address is, S. Isawa, 50 Dairokuten cho Koishikawa, Tokyo, Japan.

M. G.

THE DIAGRAM PUZZLES.

A letter of inquiry, sent to superintendents of schools, asking information upon the degree of success met with by teachers and pupils in reading the diagram puzzle, printed in our October issue, has brought responses showing evidence of wide-spread interest in the puzzle and its interpretation. There were many correct readings sent in, and others

incorrect only in a single word or element. Not a few letters, commenting upon the new feature of the department, expressed the hope that it would be made permanent—puzzles appearing regularly; and two or three asked that a series of standard diagrams be printed covering all the elements of English speech. This last, it may be said, is in contemplation, the work being, in fact, already under way. It is hoped to publish this series in an early issue of the REVIEW and also to furnish the diagrams on separate cards for use in the school room. We take this occasion to invite our readers to report upon their success in reading the diagram puzzle on another page of this issue, and from teachers we would like also a report upon the success of their pupils in reading it.

F. W. B.

"Stories and Rhymes in Melville Bell Symbols," a sixteen page booklet, can be obtained by addressing the Volta Bureau. Price 25 cents per dozen copies. Also, blank speech diagrams, 60 on a sheet, at 60 cents per hundred sheets.

EDITORIAL COMMENT.

THE COLLEGE OF TEACHERS OF THE DEAF AND DUMB, LONDON.

We would call the special attention of our American readers to the article by Mr. Frank G. Barnes, under the above subject, printed elsewhere in this issue. If there is one weakness more notable than any other in our American system of deaf education, it is that we have no such examination and certification of teachers as has been provided for by our British cousins and as exists in one form or another in most, if not all, European countries. It would seem that the next great move forward in our work should be upon this line, to secure certification of teachers of deaf children—teachers doing the most difficult of educational work—by some constituted examining body with full authority to accept the qualified and to reject the unqualified candidates for positions in our schools. The work is a profession, in the ideal view of it, and it should be no easier for those unfitted or unprepared for it to enter it than to enter the profession of law or medicine or the Christian ministry. The profession—calling it that—is cheapened under present loose methods of admitting to its ranks, and, far worse than that, the work suffers sadly, in too large a part of it, at the hands of incompetents, whom an examining body, were it existing and acting, would easily have discovered and rejected.

In addition to Mr. Barnes' paper, we give, in the Institution Press Department, the complete list of questions asked by the Joint Examination Board at their last examination given, as we understand, in July, to candidates for certificate appearing before them. The questions in their character and scope give clear and abundant evidence of the high standard aimed at by the College, and the fact that nearly 400 teachers, as Mr. Barnes reports, in the past twenty-three years have successfully taken the examination and won certification, gives in itself evidence of the high average of professional culture and ability that must prevail in the present generation of British teachers.

It would be well if the profession, in its present-day leadership in our country, should take up this question of professional training and teacher certification and make a study of it in the

light of what is being done at this time in the way of its solution in Europe. It is certainly a question worth while, and consideration and some practical solution of it would tend more than anything else to standardize and unify the work of the country upon a high plane, not only of teacher capacity but of pupil attainment as well, for both go together. And why may not Great Britain's solution of it, be, in all its essential features, our own, and we have in time, in name and in fact, an American College of Teachers of the Deaf, whose certification will be prequisite to entrance by anyone upon the trust and responsibility of teaching deaf children to the full of their capacity for education? F. W. B.

A SUCCESSFUL PHOTOGRAPHER.

The last "Bulletin of the Aërial Experiment Association," of date November 16, publishes an admirable photograph of the late Lieutenant Thomas E. Selfridge, who lost his life by the fall of the Wright aëroplane at Fort Myer, and brings out the fact, in editorial reference to it, that the picture was taken by a deaf photographer, Mr. Frederic Haesler, of Philadelphia. We know Mr. Haesler personally, and know further that, though he is congenitally and totally deaf, he carries on his business through speech and speech-reading, and that he is moreover one of the most popular and successful photographers in Philadelphia. The Bulletin editorial follows:

"For the fine photograph of Lieutenant Selfridge which forms the frontispiece of this number we are indebted to Mr. Conrad Frederic Haeseler, a former pupil of the Pennsylvania Institution for the Deaf at Mt. Airy, Philadelphia. Mr. Haeseler was born deaf and educated exclusively by the oral method, having entered school on the first day that the oral class was begun. He was the first pupil to graduate, under the oral instruction, from that Institution, and the only one of the original class that finished the entire course of instruction. He was the first pupil sent to a hearing school from the Mt. Airy Institution, having been placed in the school of industrial art in Philadelphia, where he earned three scholarships in three successive years. This, with two additional years at the Pennsylvania Academy of Fine Arts, gave him fully six years of active art study. At the end of that time he became interested in photography, in which his father (Albert S. Haeseler) encouraged him, as being a more practical occupation for a deaf man. This has resulted in the establishment of a large photographic studio and a reputation enjoyed by no other Philadelphia photographer. Mr. Haeseler has certainly succeeded in producing the finest and most natural photograph of Lieutenant Selfridge we have seen."

A CORRECTION.

Our attention having been called by Mr. Wm. Wade, of Oakmont, Pa., to a definition of astigmatism, given in an article in the October REVIEW, which definition he considered erroneous, we referred the point, at his suggestion, to Dr. George M. Gould, of Ithaca, New York, a recognized authority upon the subject. Dr. Gould's reply to our letter follows:

DEAR MR. BOOTH: Thank you for sending me a copy of the ASSOCIATION REVIEW containing the article by Mr. Ermoloff. On page 386 of this article I find that Mr. Ermoloff, unintentionally of course, has made a mistake in his definition of astigmatism. Astigmatism is not, as he says, due to a difference in the seeing power of the two eyes, as such, but is due to the fact that the cornea of the eye is malcurved—that is, has a different radius of curvature in one meridian from that in the other. Mr. Wade, in the letter quoted in your letter, also makes another mistake equally bad in defining astigmatism as being due to the irregular shape of the lenses of the eye. Astigmatism is not, except in some rare cases outside of the rule, due to imperfection in the shape of the lenses, but to imperfection of the shape of the cornea.

GEO. M. GOULD.

THE DECEMBER MEETING OF THE BOARD.

The regular annual meeting of the Board of Directors of the Association will be held at the Volta Bureau, Washington, on December 17. Various matters of importance are to come up for consideration, including the future management and conduct of the Volta Bureau, recently transferred to the custody of the Association, and the fixing the date of and making arrangements for the Summer Meeting, with full programme, to be held the coming summer at Chicago.

F. W. B.

THE BEVERLY, MASS., SCHOOL RECEIVES A BEQUEST.

Information is received that the New England Industrial School, located at Beverly, Mass., has received a bequest of $50,000. This large addition to the resources of the school will greatly facilitate its work and enable it to enlarge its scope of usefulness. All connected with the school are to be congratulated upon its bright outlook, and we rejoice with them in this good fortune.

F. W. B.

DEPOSITING BOUND VOLUMES OF INSTITUTION PAPERS IN THE VOLTA BUREAU.

The Volta Bureau has recently received a bound volume of the last school year's numbers of the Deaf Carolinian, the paper published at the Morganton, N. C., school. It is a handsome book, full of valuable matter, and it is in every way fitting that it have permanent place in the library of the Bureau. This leads us to suggest, and even urge, that every Institution publishing a paper in the country make it the practice, upon the completion of a volume, to deposit a bound copy of it in the Volta Bureau for reference and preservation. The Bureau is fire-proof, and there could be no better or more fitting place to deposit such literature, insuring its preservation and usefulness for all the years and centuries to come.

F. W. B.

THE VOLTA BUREAU BECOMES THE CHARGE OF THE AMERICAN ASSOCIATION TO PROMOTE THE TEACHING OF SPEECH TO THE DEAF.

As was foreshadowed in the June number of the REVIEW, the final act has been consummated in the passage of the proper legal papers, whereby the Volta Bureau property and funds are placed under the charge and control of the American Association to Promote the Teaching of Speech to the Deaf. Until now the Volta Bureau has had no corporate existence. It has been, strictly speaking, but the private property of its founder, Dr. Alexander Graham Bell, used by him as a channel for personal philanthropy in the work of "the increase and diffusion of knowledge relating to the deaf." Its affairs were administered as a trust, Mr. Charles J. Bell, President of the American Security and Trust Company, being the trustee. The property being personal and the trust being revokable at the will of the present or a future owner, it was necessary, with the view to insuring the permanency of the Volta Bureau and making perpetual its work, either to give to it independent incorporation or to transfer it to the control of a corporation already in existence. The decision was in favor of the latter course, and the American Association to Promote the Teaching of Speech to the Deaf, incorporated under the laws of the State of New York, has been given, under conditions imposed, ownership and direction of the Volta Bureau property and funds, such ownership and control to continue so long as the imposed conditions are fulfilled.

In order that the members of the Association may have full

knowledge and clear understanding of the action taken that places upon them henceforth the work and responsibility of management of the Volta Bureau, we give below a copy of the Agreement, formally drawn, signed, and sealed, whereby the property and funds are transferred and the imposed obligations are entered into:

AGREEMENT

Between Alexander Graham Bell and American Association to Promote the Teaching of Speech to the Deaf (Incorporated).

July 15, 1908.

Whereas, Alexander Graham Bell, on or about June 27, 1887, delivered to his father, Alexander Melville Bell, certain cash and securities for the purpose of founding and maintaining a Bureau for the Increase and Diffusion of Knowledge relating to the Deaf, which fund was, in turn, and with the consent of the said donor, transferred by Alexander Melville Bell to Charles J. Bell, who has since acted as Trustee of said fund, the same now consisting of real estate and personal securities as set forth on the schedule hereto attached marked "A," and made a part of this instrument.

And whereas, on May 4, 1897, said Alexander Graham Bell also transferred to said Charles J. Bell certain additional securities and money to be held by him as Trustee of the "Volta Bureau Fund," the income from which moneys and securities was to accumulate and be invested by said trustee from time to time and added to the principal fund last above described, and which now consists of real estate and securities as set forth upon the schedule hereto attached marked "B" and made a part of this instrument.

And whereas, the said Alexander Graham Bell, as original donor of each of said funds, has caused the work of the said "Volta Bureau," now located at 35th street and Volta Place, Washington, D. C., and for the purpose above stated, to-wit: the Increase and Diffusion of Knowledge relating to the Deaf, to be conducted and continued, but now desires such work continued under some corporate management in order that the benefits thereof may be more permanently assured, and to that end desires the said work taken over and so continued by and under the direction of the American Association to Promote the Teaching of Speech to the Deaf (incorporated), and in accordance with the terms and conditions hereinafter set forth.

Now, therefore, this agreement, made this 15th day of July, A. D. 1908, by and between the said Alexander Graham Bell, of the first part, and the said American Association to Promote the Teaching of Speech to the Deaf, a corporation created and now existing under the laws of the State of New York, or its duly organized successor in said work, of the second part.

Witnesseth, that for and in consideration of the premises, and the further sum of One Dollar, lawful money of the United States of

America, in hand paid by the party of the second part unto the party of the first part, the receipt whereof is hereby acknowledged, the party of the first part does hereby agree to cause the real and personal property in the aforesaid schedules "A" and "B," whereof copies are hereunto annexed, to be transferred by the said Charles J. Bell, the present trustee thereof as aforesaid, unto the American Security and Trust Company, a corporation, in the District of Columbia (the execution and exhibition of this Agreement being hereby made full authority to the said Charles J. Bell, the present trustee, to make such conveyance, assignment and transfer thereof to said American Security and Trust Company), subject to all the rights, duties and obligations herein provided for in respect of such Trustee, to be by said American Security and Trust Company, its successors and assigns, taken and held as a trust fund, and to continue to be known as and called the "Volta Bureau Fund," the principal whereof, and the increase therein, as hereinafter directed shall be by it, its successors and assigns, held in and upon the trusts following, and none other—that is, to take, have and hold the same with power for the purposes of investment or reinvestment, to sell and convey the said personal securities or exchange the same, or any part thereof, or to substitute for the same other good and valid securities of equal value whenever, in its discretion, it may deem it best so to do, and the proceeds of any sale or sales to invest and reinvest and keep invested, with no obligation on the part of any purchaser from the trustee to see to the application of the purchase money or to the proper performance of any trust on its part to be performed and the net annual income arising from or out of said fund, after payment of all taxes, insurance, repairs and other charges or expenses connected with the maintenance of the real estate known as said "Volta Bureau," to pay over, at convenient periods, to the party of the second part hereto, one-half of the remainder, not less, however, in any one year, than Two Thousand ($2,000.00) Dollars, and the balance of such net annual income to be invested as a part of the principal trust fund, and to permit the use and occupancy of the real estate and building known as the "Volta Bureau," as above described by the party of the second part hereto, as long as the party of the second part or its successor in incorporation and work shall well and faithfully keep and perform the duties, covenants and conditions by it to be so kept and performed and as hereinafter expressed; and when the present invested capital fund has been increased by Fifty Thousand ($50,000.00) Dollars or more, a sum not exceeding one-half of such increase of the capital fund may, in the judgment of the party of the second part, be applied by the trustee to the erection of such additional building or buildings as the Board of Directors of the party of the second part may determine and authorize, and such building or buildings and the ground occupied by the same shall become and remain part of said "Volta Bureau Fund" and subject, in all respects, to the conditions in this instrument expressed.

In consideration of the premises, and of the payments from the annual net income of the trust fund, as above provided, and the use

of the real estate and building known as the "Volta Bureau," as above described, party of the second part, for itself and its successor or successors therein, does hereby covenant, promise and agree to and with the party of the first part that it, and its successor or successors in such work, will continue to fully and faithfully carry out the objects set forth in the certificate of incorporation of said Association, viz: "To aid schools for the Deaf in their efforts to "teach speech and speech-reading by providing schools for the "training of articulation teachers; by the employment of an agent "or agents who shall, by the collection and publication of statistics "and papers relating to the subject, and by conference with teachers "and others, disseminate information concerning methods of teach-"ing speech and speech-reading and by using all such other means "as may be deemed expedient, to the end that no deaf child in "America shall be allowed to grow up 'deaf and dumb' or 'mute' "without earnest and persistent efforts having been made to teach "him to speak and read the lips," and in carrying on the work of the said Volta Bureau in the Increase and Diffusion of Knowledge relating to the Deaf, so far as said work may not be inconsistent with the objects hereinabove set forth.

And it is further agreed, by and between the parties hereto, that when the principal of the Trust Fund herein first provided shall reach the sum of One Million ($1,000,000.00) Dollars, no further addition to such principal fund shall be made from the annual income therefrom, but the net proceeds thereof, after deduction and payment of the sum or sums necessary to maintain in proper condition and repair the said Volta Bureau building or other real estate of said fund, and all taxes, insurance or other proper charge thereon shall be paid over to the party of the second part; and the party of the second part also agrees that in case it shall now or hereafter be found necessary so to do, to amend its existing articles of incorporation in lawful manner, in respect of the purposes of its organization, to include the work of the Increase and Diffusion of Knowledge relating to the Deaf, as above set forth;

And the party of the second part further covenants and agrees to and with the party of the first part that the title and custody of said "Volta Bureau Fund," in whatsoever it may consist, shall be and remain in and with the said American Security and Trust Company as such trustee, or such trustee as may be substituted for it, so long as said party of the second part or its lawful successor shall not fail to perform and keep the covenants and agreements on its part and by this instrument provided.

And it is further agreed, by and between the parties hereto, that the party of the second part shall have the right at any time, upon reasonable notice to the said Trustee Company, to discharge said company as trustee hereunder, and substitute in its place and stead some other well-known and established trust company, which shall assume all and singular the duties and functions required by the trust to be now conferred upon the said American Security and Trust Company hereunder.

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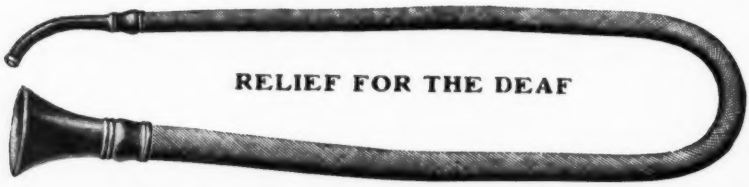

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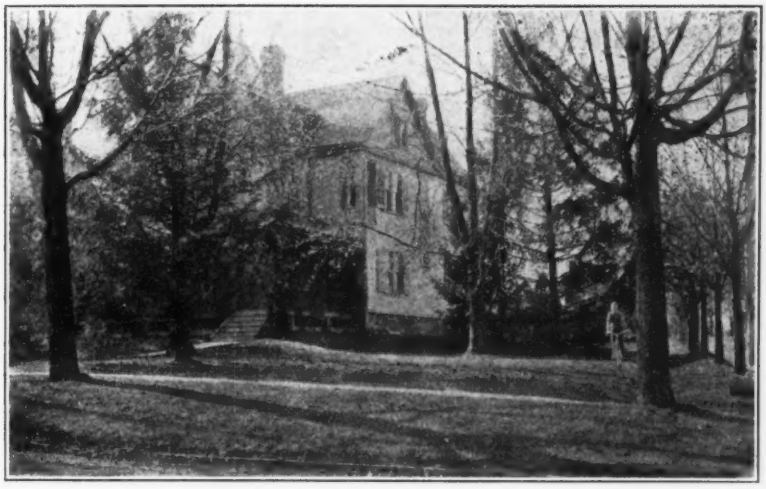

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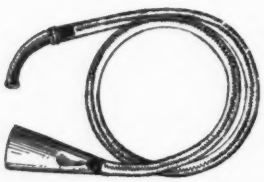

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